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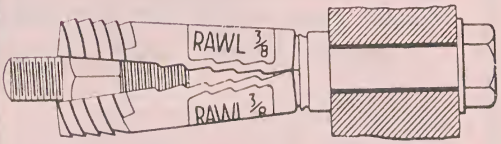

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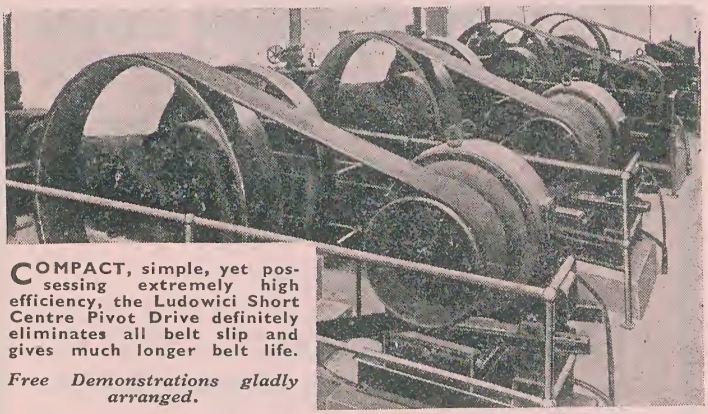

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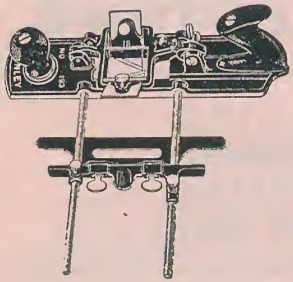
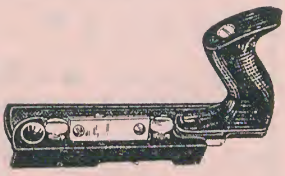


Fibre Board Beveller No. 194.



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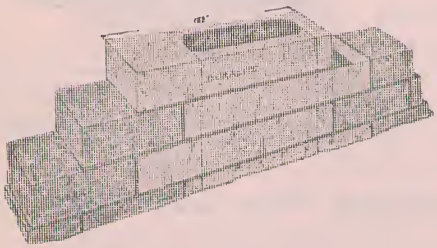

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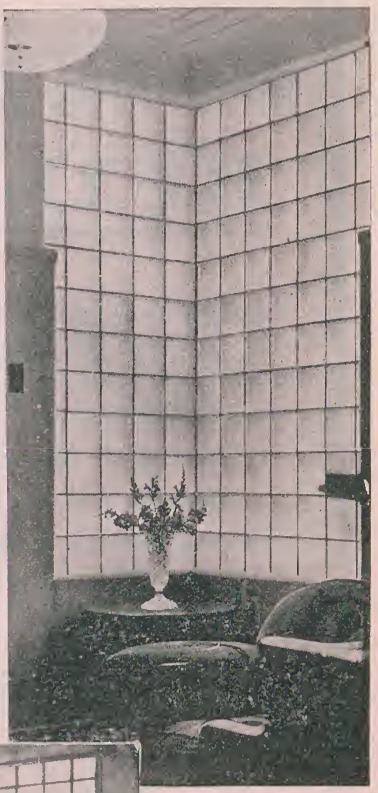

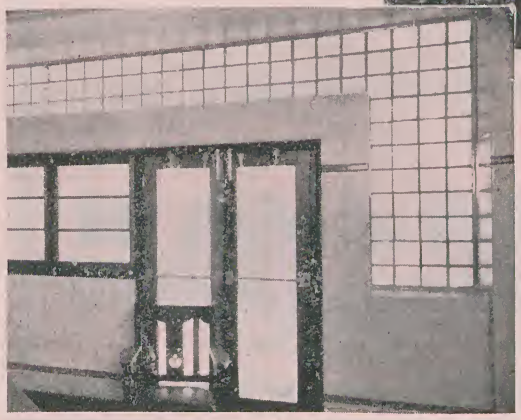

(ABOVE) Note how well "Insulux" Glass Bricks light a corner that would otherwise be dark in this modern lounge room, and how well they harmonize with the simplicity o the general design.

(LEFT) Interior view of the Bar entrance at the Royal Hotel, Brisbane. While ensuring abundant natural light within, "Insulux" Glass Bricks also lend charm and distinction to the exterior.

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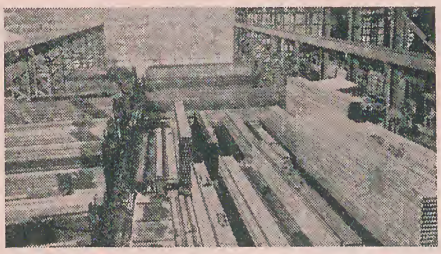

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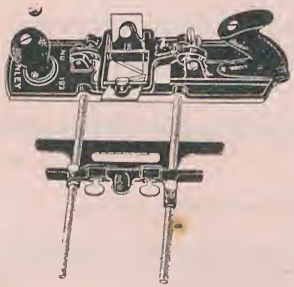

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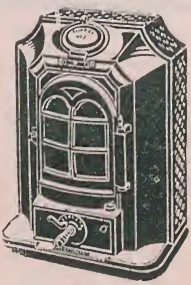

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BY

C. ERNEST MAYES

Builder and Government Contractor

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1938

Introduction by the Author

THIS book was first published in Victoria in 1859 by my father, the late Chas. Mayes, a clever civil engineer and architect, and at different intervals, prior to his death, six other editions were published.

I, as a Builder and Contractor in 1900, assisted him with the preparation of the Sixth Edition, and have since then brought out the 7th, 8th, and 9th Editions, revised to date, practical and illustrated.

Being a proved and standard work it commands a ready sale throughout the entire building and allied trades.

A comprehensive general index shows contents of subjects, together with a separate index for quick reference to the numerous tables which appear throughout this work.

Any suitable suggestions or information that would improve future issues will be gladly received.

C. ERNEST MAYES

(Author).

PREFACE

IN reconstructing the 10th Edition of MAYES' AUSTRALIAN BUILDERS' & CONTRACTORS' PRICE BOOK special care has been taken to make all statements as correct as possible, and quite a number of articles throughout the work have been specially prepared by experts associated with various sections of the Building Trade. The change from the old to the modern methods of construction is most noticeable and various tables and data for guidance in costing have been inserted.

To the City Council of Sydney I am indebted for their valuable CONSTANTS OF LABOUR TABLE, calculated from the average time in stated work actually carried out. The TABLES ON CONCRETE REINFORCEMENTS by Malcolm S. Stanley, M.C., A.M.I.E., will also save time in estimating. LEGAL NOTES, relating to Australian Contracts, Employers, Architects' Agreements, etc., also article on Workmen's Insurance, will, I feel sure, be found useful. Prices of labour are calculated at the rates of wages stated under each trade, and any variation can be adjusted should Wages or Materials alter in cost. Prices for Plant and Tools used by various contractors and tradesmen have been included and should prove useful for reference purposes. Owing to the very unsettled state of the metal market, various distributors of manufactured metal goods are unable to quote firm prices, as future supplies and costs are somewhat uncertain. This is due principally to the unsettled state of international affairs, the outcome of which no one can forecast. Fixed prices with similar profit adapted to all circumstances are impossible.

Cost prices under favourable circumstances are herein quoted, leaving to the contractor to add what he considers

a fair margin to cover profit and incidental expenses as locality and various circumstances warrant.

Any reference made to names of agents, manufacturers, or brands is for the convenience of contractors only, and not for advertising purposes.

The chief value of this publication is as a book of reference where the average or standard prices obtainable can be ascertained, and is thus both a guide to, and also a check upon contractors' own current prices and methods. The author will be pleased to receive suggestions that would add to the value of this work and so be of greater benefit to those for whom it is published.

To the young men, especially those engaged in the selling of building materials, who so desire to increase their knowledge and general usefulness, will find much to interest them, and a study of the various tables will enable them to ascertain with promptitude the answer to many of the problems associated with their daily routine work.

In conclusion I have to thank those who have rendered me valuable service in preparing this edition.

C. ERNEST MAYES.

Sydney, 1938.

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THE

AUSTRALIAN

Builders and Contractors' Guide

(REVISED EDITION)

COMPLETE WITH TABLES, PRICES, Etc.

QUANTITIES AND MEASUREMENTS.

In addition to the rules for measurements given under the various trades, the following mems. will be found useful.

Adhere as much as possible to one system and routine of measurement, following the order pursued by the builder, &c., in actual construction.

In taking dimensions, it will be found most convenient to work from left to right. In unusual designs, make sketch plans with dimensions.

In excavations, foundations, or walls of a building, take the back and front and parallel walls from out to out, and the other walls in the clear.

In scaling from a plan, when the dimensions are not given, apply the reading of the scale at the end of the first dimension to the commencement of the second dimension; repeating the operation until the scale is exhausted or the end of the scale is reached; note these accumulated dimensions, and repeat the process until the whole of the sizes required are measured.

The measurement of the length of foundation walls will be a check on the measurement of the walls forming the superstructure. These lengths can be taken for the trenches in excavation, allowing about 12 inches in the widths to enable tradesmen to work.

As the excavation, levelling and stepping of trenches, with part refilled and rammed, are worth double or treble ordinary excavation, they must be kept separate.

Rock excavation should be reckoned by the cube yard with the stepping and levelling by the foot super.

Chimney breasts, including fireplaces, are generally reckoned solid, allow for arch separately, when the fireplace opening is deducted.

Cornices, strings, &c., are reckoned solid, the length, breadth and depth being taken.

Ovens, coppers and furnaces are reckoned solid by the cube yard.

Facings, pointing, &c., by the yard super or square of 100 sup. feet.

Gauged arches, cuttings, &c., by the foot super.

Openings.—The width is always given first and then the height ; **daylight,** or the size of opening in wall being included.

If the head is curved, the height from the stone or brick sill to the centre of soffit is implied, unless stated otherwise.

Flooring may include joists, at per square, or the joists may be taken at per hundred lineal feet, stating the scantling. If the flooring is taken net, it will form with the hearths and chimney breasts a check for the plastering or lining of ceilings, after deducting well-holes of stairs, &c. If the net measurement is taken for flooring, an addition must be made to the price to allow for loss of width by tongueing and grooving, besides short lengths and remnants too short to work in. This, with 6 x 1 T. and G. flooring, would be about ten per cent.

Chimney breasts or flues are not deducted in measuring ceilings.

The lineal measurement of facia next eaves will also give the length of eaves for slating, and the length of eaves spouting, with one foot added for each angle. The soffit, if more than 11 in. wide, should be reckoned by the foot super.

Bracketing, per super foot—Take lengths of walls by the girth of brackets.

Ribbed and other centreing, per foot super, and supports added.

Joinery is reckoned by the foot super, or lineal foot, as given under the various headings.

BUILDERS' PRICES are usually made up of material, labor, cartage, scaffolding, waste and profit.

The cost of each varies from time to time, the site and weather have to be considered, so there could not possibly be fixed prices ; add 5 per cent. for established charges ; 5 per cent. depreciation of plant ; 10 per cent. profit for jobs from £500 up to £1000.

All kinds of work, if done in small quantities, are worth from 30 to 50 per cent. more than that in large areas and quantities.

Also, the smaller the area and more confined the space for workmen, and cramped handling of materials are important items governing cost.

Also **repetition** work in larger structures, such as **concrete moulds** or **forms, faience** or **facing work,** sameness of openings and fittings.

ANOTHER CONTRACTOR'S METHOD to save labor in estimating is to concentrate measurements of buildings into as few items as possible, making a **schedule** of grouped prices for different qualities of the work, allowing for the usual openings.

Walls of brickwork by the 1,000 bricks contained, reckoning 9 bricks to the square foot of finished brick work.

Plastering, or **covering facings** to external and internal walls, at per 100 square feet, or the square yard.

Flooring, including joists, plates, different kinds of scantling, at per square.

Roofing material, including rafters, timbers, and scantling, sometimes slates, tiles or iron, are added at per square.

Ceilings, including joists, at per square; cornices and picture rail can be added after.

Verandahs, including paving, plates, posts, woodwork, per foot run, according to width.

Foundations, bay windows, porches, reckoned according to detail.

Usual door and window openings, including architraves, complete, fitted with ordinary doors, furniture, glazing, at per opening, or superficial foot. This method is also approximate, and requires judgment in its application.

REMEMBER !

FIXED PRICES

WITH SIMILAR PROFIT

ADAPTED TO ALL CIRCUMSTANCES

ARE IMPOSSIBILITIES.

GENERAL DEDUCTIONS ON COST.

The carcass of a building costs about 2/3rds. of the work finished.

For forming site (re-forming roads cut up), fences, drainage and water supply, add about 8 per cent. on to cost of ordinary house or cottage.

Brick buildings cost 10 to 20 per cent. less than stone ones.

Wooden buildings 30 to 50 per cent. less than stone.

Concrete blocks, 20 to 35 per cent. less than stone.

The Repairs or upkeep of a dwelling building: After the first year reckon 1 per cent. on prime cost; after the tenth year, 2 to per cent. of cost.

Standard prices of materials and labor are given throughout. If any increase or decrease occur at any time, ascertain the percentage and add or deduct.

WEIGHT OF BUILDING MATERIALS.

Stone, &c.

Australian	Per cubic foot lbs.	Cubic feet per ton
Oamaru, Typo, Waurn Ponds and Geelong freestones	134	16½
Kyneton sandstone...	138	16¼
Western Port do. ...	148	15
Spring Bay ditto ...	140	16
Pt. Ventenet do. ...	145	15½
Grampian sandstone	154	14½
Sydney sandstone ...	140	16
Bluestone (basalt) ...	161	14
Granite, grey or red	167	13½
Marble, Adelaide ...	169	13¼
Brickwork, dry, about	124	18
Sand (sharp), about	95	23½
Clay, mild earth ...	120	18½
Clay, strong and stiff	135	16½
Mortar, dry	93	24

Australian Facings.

In.		Ft. sup. p. ton
4	Sydney sandstone ...	48
3	Sawn bluestone ...	84
2½	thick Ditto, ...	70
2	thick Ditto, ...	56
1	Slate, Welch	160
1½	Ditto	107
1	Marble slabs, black ...	165
1	Do., white or veined	160

	Per cubic foot lbs.	Cubic feet per ton
Granite, Aberdeen ...	163	13¾
Marble, Carrara ...	170	13¼
Cast Iron	464	4.83
Mild Steel	477	4.70

Timber.

Imported	Per cubic foot lbs.	Cubic feet per ton
Red or White American pine (seasoned)	34	66
Yellow pine, Baltic (seasoned) ...	35	64
Red pine, Riga ditto	33	68
Pitch pine (seasoned)	39	57
Cedar, Spanish American (seasoned) ...	30	75
Mahogany, Spanish	66	34
Mahogany, Honduras, or Baywood ...	40	56
Oak, just felled ...	68	33
Oak, of commerce	57½	39
Oak, well seasoned ...	48	47
Elm, just felled ...	58	38
Elm, well seasoned...	42	53
Teak, Indian, do ...	42	53
Ebony	80	28
Australian.		
Cedar, N.S.W. ...	36	62
Kauri, New Zealand	40	56
Hardwood, about ...	56	40
Iron bark and box, just felled ...	70	32
Blue or red gum, ditto	65	34½
Stringy bark and Blackwood, do. ...	64	35
The 4 H.-woods average	60	37½
Jarrah	51	44
Maple, American ...	47	48
Maple, Queensland	48	47
Walnut, black ...	60	37
Walnut, Tasmanian...	56	40

See also Index.

WEIGHT OF BUILDING MATERIALS.

Roofing, *per square.*	cwt.
Slates, 4in. lap ...	6
Palings, half, 5 or 6ft.	3 to 4
Shingles	2½ to 3
Zinc, plain, 8 to 12 gauge	⅝ to 1¼
Gal. Iron, 26 and 24 gauges, lapped 2 corrugations ...	1 to 1½

Lead—add 00 to the lbs. per foot for the lbs. per square (that is, multiply by 100) and allow for laps.

The rolls are generally 30 ft. by 7 ft. wide.

Floors, *per square.*	cwt.
1in. T. and G. American red of white pine	2
1 1/8in. wrought Baltic red pine ...	2⅛
1in. ditto, pitch pine	2⅛
1in. Colonial Pine, T. & G.	2½
1in. Oregon, T. & G.	2½
⅞in. Oregon, T. & G.	2¼
1in. Hardwood, T. & G.	6
⅞in. Firsts, T. & G.	5

GLAZED LEAD LIGHT.

3 lbs. per sq. ft. average.

Sheet glass, per 16 oz. to 21oz. and per foot Plate glass.

Floors should be made to Support per sq. ft.

	cwt.
Private or ordinary rooms, etc.	from 1 to 2
Public Rooms for meetings, halls, theatres, etc., per square ft.	2½
Warehouses or stores, railway or wharf platforms, road bridges	3
Railway bridges or viaducts	5

Metals, *per cubic inch.*	lbs.
Iron bar	0.279
Iron or tin, cast ...	0.263
Steel, hard	0.283
Lead	0.411
Copper, cast ...	0.318
Brass, cast ...	0.304
Zinc, cast	0.26
Gun metal	0.31

Lime, Cement, &c.	lbs.
Lime, heads, p. bag, 3 bus	180
Do. Geelong roche do.	200
Cement, Portland, p. cask of 3½ bushels	400
Plaster of Paris, p. ck. 3½ bushels ...	Net, 300

Cement and Concrete Aggregates, *average per cubic ft.*	lbs.
Coke, breeze ...	37
Clinker	80
Brick, broken ...	120
Sandstone, broken	140
Bluestone basalt ...	160
Bricks, *per cubic foot.*	
Black or red ...	131
Sydney machine (commons)	101
Hand Made Sandstock (commons) ...	84

Concrete Material.	Per cubic foot lbs.	Cubic feet per ton
Cement Portland ...	90	24
Cinders, clean ...	60	37
Coke, ordinary ...	46	49
Coke, breeze... ...	37	60½

Water, *rain or pure, at* 62 deg. 62½ lbs or 6¼ gallons, one cubic ft. 10 lbs., or 277¼ c. ins., one gallon. 35.85 c. ft., or 224 gallons, one ton.

8 gallons or 1 ft. 3½-12ths cube, one bushel.

1 bushel, 1.28 c. ft.

2 of 4 gall. kerosene tins, = ½ bushel each tin.

See also Index.

CIRCUMFERENCES AND AREAS OF CIRCLES.

for either inches, feet, yards, links or chains.

Dia	Circum.	Area.	Dia.	Circum.	Area.	Dia.	Circum.	Area.
			9	28.27	63.62	18	56.55	254.47
¼	0.785	.049	¼	29.06	67.20	¼	57.33	261.52
½	1.571	.196	½	29.84	70.88	½	58.12	268.80
¾	2.356	.442	¾	30.63	74.66	¾	58.91	276 12
1	3.142	.782	10	31.42	78.54	19	59.69	283.53
¼	3.927	1.227	¼	32.20	82.52	¼	60.47	291.04
½	4.712	1.767	½	32.99	86.59	½	61.26	298.65
¾	5.498	2.405	¾	33.77	90.76	¾	62.05	306.35
2	6.283	3.142	11	34.56	95.03	20	62.83	314.16
¼	7.069	3.976	¼	35.34	99.40	¼	63.62	322.06
½	7.854	4.909	½	36.13	103.87	½	64.40	330.06
¾	8.639	5.939	¾	36.91	108.43	¾	65.19	338.16
3	9.425	7.068	12	37.70	113.10	21	65.97	346.36
¼	10.210	8.296	¼	38.48	117.86	¼	66.76	354.66
½	10.995	9.621	½	39.27	122.72	½	67.54	363.05
¾	11.781	11.044	¾	40.05	127.68	¾	68.33	371.54
4	12.566	12.566	13	40.84	132.73	22	69.11	380.13
¼	13.351	14.186	¼	41.63	137.89	¼	69.90	388.82
½	14.137	15.904	½	42.41	143.14	½	70.69	397.61
¾	14.922	17.720	¾	43.20	148.49	¾	71.47	406.49
5	15.71	19.63	14	43.98	153.94	23	72.26	415.48
¼	16.49	21.65	¼	44.77	159.48	¼	73.04	424.56
½	17.28	23.76	½	45.55	165.13	½	73.83	433.73
¾	18.06	25.97	¾	46.34	170.87	¾	74.61	443.01
6	18.85	28.27	15	47.12	176.71	24	75.40	452.39
¼	19.63	30.68	¼	47.91	182.65	¼	76.18	461.86
½	20.42	33.18	½	48.69	188.69	½	76.97	471.44
¾	21.20	35.78	¾	49.48	194.83	¾	77.75	481.11
7	21.99	38.48	16	50.26	201.06	25	78.54	490.87
¼	22.78	41.28	¼	51.05	207.39	¼	79.32	500.74
½	23.56	44.18	½	51.84	213.82	½	80.11	510.71
¾	24.35	47.17	¾	52.62	220.35	¾	80.90	520.77
8	25.13	50.26	17	53.41	226.98	26	81.68	530.93
¼	25.92	53.46	¼	54.19	233.70	¼	82.47	541.19
½	26.70	56.74	½	54.98	240.53	½	83.25	551.55
¾	27.49	60.13	¾	55.76	247.45	¾	84.04	562.00

TABLE (*Continued*), SHOWING CIRCUMFERENCES AND AREAS OF CIRCLES, *for either inches, feet, yards, links, or chains.*

Dia	Circum.	Area.	Dia.	Circum.	Area.	Dia.	Circum.	Area.
27	84.82	572.56	36	113.10	1017.9	45	141.37	1590.4
¼	85.61	583.21	¼	113.88	1032.1	¼	142.16	1608.2
½	86.39	593.96	½	114.67	1046.4	½	142.94	1626.0
¾	87.18	604.81	¾	115.45	1060.7	¾	143.73	1643.9
28	87.96	615.75	37	116.24	1075.2	46	144.51	1661.9
¼	88.75	626.80	¼	117.02	1089.8	¼	145.30	1680.0
½	89.53	637.94	½	117.81	1104.5	½	146.08	1698.2
¾	90.32	649.18	¾	118.59	1119.2	¾	146.87	1716.5
29	91.11	660.52	38	119.38	1134.1	47	147.66	1734.9
¼	91.89	671.96	¼	120.17	1149.1	¼	148.44	1753.5
½	92.68	683.49	½	120.95	1164.1	½	149.23	1772.1
¾	93.46	695.13	¾	121.74	1179.3	¾	150.01	1790.8
30	94.25	706.86	39	122.52	1194.6	48	150.80	1809.6
¼	95.03	718.69	¼	123.31	1209.9	¼	151.58	1828.5
½	95.82	730.62	½	124.09	1225.4	½	152.36	1847.5
¾	96.60	742.64	¾	124.88	1241.0	¾	153.15	1868.6
31	97.39	754.77	40	125.66	1256.6	49	153.94	1885.7
¼	98.17	766.99	¼	126.45	1272.4	¼	154.72	1905.0
½	98.97	779.31	½	127.23	1288.2	½	155.51	1924.4
¾	99.75	791.73	¾	128.02	1304.2	¾	156.29	1943.9
32	100.53	804.25	41	128.81	1320.3	50	157.08	1963.5
¼	101.32	816.86	¼	129.59	1336.4	¼	157.87	1983.2
½	102.10	829.58	½	130.38	1352.6	½	158.65	2003.0
¾	102.89	842.39	¾	131.16	1369.0	¾	159.44	2022.8
33	103.67	855.30	42	131.95	1385.4	51	160.22	2042.8
¼	104.46	868.30	¼	132.73	1402.0	¼	161.01	2062.9
½	105.24	881.41	½	133.52	1418.6	½	161.79	2083.1
¾	106.03	894.61	¾	134.30	1435.4	¾	162.58	2103.4
34	106.81	907.92	43	135.09	1452.2	52	163.36	2123.7
¼	107.60	921.32	¼	135.87	1469.1	¼	164.15	2144.2
½	108.38	934.82	½	136.66	1486.2	½	164.93	2164.8
¾	109.17	948.41	¾	137.45	1503.3	¾	165.72	2185.4
35	109.96	962.11	44	138.23	1520.5	53	166.50	2206.2
¼	110.74	975.90	¼	139.02	1537.8	¼	167.29	2227.1
½	111.53	989.80	½	139.80	1555.3	½	168.08	2248.0
¾	112.31	1003.7	¾	140.59	1572.8	¾	168.86	2269.1

TABLE (*Continued*), SHOWING CIRCUMFERENCES AND AREAS OF CIRCLES, *for either inches, feet, yards, links, or chains.*

Dia	Circum.	Area.	Dia.	Circum.	Area.	Dia.	Circum.	Area.
54	169.65	2290.2	63	197.92	3117.3	72	226.20	4071.5
¼	170.43	2311.5	¼	198.71	3142.0	¼	226.98	4099.8
½	171.22	2332.8	½	199.49	3166.9	½	227.77	4128.3
¾	172.00	2354.3	¾	200.28	3191.9	¾	228.55	4156.8
55	172.79	2375.8	64	201.06	3217.0	73	229.34	4185.4
¼	173.57	2397.5	¼	201.85	3242.2	¼	230.12	4214.1
½	174.36	2419.2	½	202.63	3267.5	½	230.91	4242.9
¾	175.14	2441.1	¾	203.42	3292.8	¾	231.69	4271.8
56	175.93	2463.0	65	204.20	3318.3	74	232.48	4300.9
¼	176.72	2485.1	¼	204.99	3343.9	¼	233.26	4330.0
½	177.50	2507.2	½	205.77	3369.6	½	234.05	4359.2
¾	178.29	2529.4	¾	206.56	3395.3	¾	234.83	4388.5
57	179.07	2551.8	66	207.35	3421.2	75	235.62	4417.9
¼	179.86	2574.2	¼	208.13	3447.2	¼	236.41	4447.4
½	180.64	2596.7	½	208.92	3473.2	½	237.19	4477.0
¾	181.43	2619.4	¾	209.70	3499.3	¾	237.98	4506.7
58	182.21	2642.1	67	210.49	3525.7	76	238.76	4536.5
¼	183.00	2664.9	¼	211.27	3552.0	¼	239.55	4566.4
½	183.78	2687.8	½	212.06	3578.5	½	240.33	4596.4
¾	184.57	2710.9	¾	212.84	3605.0	¾	241.12	4626.4
59	185.35	2734.0	68	213.63	3631.7	77	241.90	4656.6
¼	186.14	2757.2	¼	214.41	3658.4	¼	242.69	4686.9
½	186.93	2780.5	½	215.20	3685.3	½	243.47	4717.3
¾	187.71	2803.9	¾	215.99	3712.2	¾	244.26	4747.8
60	188.50	2827.4	69	216.77	3739.3	78	245.04	4778.4
¼	189.28	2851.1	¼	217.56	3766.4	¼	245.83	4809.1
½	190.06	2874.8	½	218.34	3793.7	½	246.62	4839.8
¾	190.85	2898.6	¾	219.13	3821.0	¾	247.40	4870.7
61	191.64	2922.5	70	219.91	3848.5	79	248.19	4901.7
¼	192.42	2946.5	¼	220.70	3876.0	¼	248.97	4932.8
½	193.21	2970.6	½	221.48	3903.6	½	249.76	4963.9
¾	193.99	2994.8	¾	222.27	3931.4	¾	250.54	4995.2
62	194.78	3019.1	71	223.05	3959.2	80	251.33	5026.6
¼	195.56	3043.5	¼	223.84	3987.1	¼	252.11	5058.1
½	196.35	3068.0	½	224.62	4015.2	½	252.90	5089.6
¾	197.14	3092.6	¾	225.41	4043.3	¾	253.67	5121.2

TABLE (*Continued*), SHOWING CIRCUMFERENCES AND AREAS OF CIRCLES, *for either inches, feet, yards, links, or chains.*

Dia	Circum.	Area.	Dia.	Circum.	Area.	Dia.	Circum.	Area.
81	254.47	5153.0	87	273.32	5944.7	93	292.17	6792.9
½	256.04	5216.8	½	274.89	6013.2	½	293.74	6866.2
82	257.61	5281.0	88	276.46	6082.1	94	295.31	6939.8
½	259.18	5345.6	½	278.03	6151.4	½	296.88	7013.8
83	260.75	5410.6	89	279.60	6221.2	95	298.45	7088.2
½	262.32	5476.0	½	281.17	6291.3	½	300.02	7163.0
84	263.89	5541.8	90	282.74	6361.7	96	301.59	7238.2
½	265.47	5608.0	½	284.31	6432.6	½	303.16	7313.9
85	267.04	5674.5	91	285.89	6503.9	97	304.73	7389.8
½	268.61	5741.5	½	287.46	6575.6	98	307.84	7542.9
86	270.18	5808.8	92	289.03	6647.6	99	311.00	7697.7
½	271.75	5876.6	½	290.60	6720.1	100	314.16	7854.0

CIRCUMFERENCES.—If the diam. is between 100 and 200, call the radius the diam. and double the given circumference. If between 200 and 300, enter the Table with one-third the diam., and multiply the given circumference by 3. If between 300 and 400, or 400 and 500, enter the Table with one-fourth or one-fifth, and multiply by 4 or 5, and so on for any number, taking care to multiply the given circumference by the same figure that you divided the diam. by.

EXAMPLE.—Required the circumference of a circle whose diam. is 152.—Enter the Table with the radius 76, the circumference given is 238.76 and 238.76 x 2 = 477.52, the circumference required.

AREAS.—If the diam. is more than 100 enter the Table with one-half or one-third, &c., as above, and multiply the area given by (4 or 9, &c.), the *square* of the figure you divided the diam. by.

EXAMPLE.—Required the area of the circle given in the last example. Opposite to 76 the area given is 4536.5 and 4536.5 x 4 [2 x 2] = 18146.0, the area required.

CAPACITY.—The given or ascertained areas in inches, multiplied by 0.0433, or the areas in feet multiplied by 6.23, will give the number of gallons equal to the area, by one foot in depth.

EXAMPLE.—Required the contents per lineal foot of a 15in. pipe. The area given is 176.71 and 176.71 x .0433 = 7.65 gallons. See p. 6. The contents per foot in depth of a tank 12ft. diam. will be — 113.10 x 6.23 = 704.6 gallons.

SQUARES OF NUMBERS ADVANCING BY $\frac{1}{8}$ths

M. S. Stanley, A.M.I.E.A.

No.	0	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$
0		.0156	.0625	.1406	.2500	.3906	.5625	.7656
1	1	1.2625	1.5625	1.8906	2.2500	2.6406	3.0625	3.5156
2	4	4.5156	5.0625	5.6406	6.2500	6.8906	7.5625	8.2656
3	9	9.7656	10.5625	11.3906	12.2500	13.1406	14.0625	15.0156
4	16	17.0156	18.0625	19.1406	20.2500	21.3906	22.5625	23.7656
5	25	26.2656	27.5625	28.8906	30.2500	31.6406	33.0625	34.5156
6	36	37.5156	39.0625	40.6406	42.2500	43.8906	45.5625	47.2656
7	49	50.7656	52.5625	54.3906	56.2500	58.1406	60.0625	62.0156
8	64	66.0156	68.0625	70.1406	72.2500	74.3906	76.5625	78.7656
9	81	83.2656	85.5625	87.8906	90.2500	92.6406	95.0625	97.5156
10	100	102.5156	105.0625	107.6406	110.2500	112.8906	115.5625	118.2656
11	121	123.7656	126.5625	129.3906	132.2500	135.1406	138.0625	141.0156
12	144	147.0156	150.0625	153.1406	156.2500	159.3906	162.5625	165.7656
13	169	172.2656	175.5625	178.8906	182.2500	185.6406	189.0625	192.5156
14	196	199.5156	203.0625	206.6406	210.2500	213.8906	217.5625	221.2656
15	225	228.7656	232.5625	236.3906	240.2500	244.1406	248.0625	252.0156
16	256	260.0156	264.0625	268.1406	272.2500	276.3906	280.5625	284.7656
17	289	293.2656	297.5625	301.8906	306.2500	310.6406	315.0625	319.5156
18	324	328.5156	333.0625	337.6406	342.2500	346.8906	351.5625	356.2656
19	361	365.7656	370.5625	375.3906	380.2500	385.1406	390.0625	395.0156
20	400	405.0156	410.0625	415.1406	420.2500	425.3906	430.5625	435.7656

The above table is read vertically and horizontally.

Thus the square of $5\frac{1}{2} = 30.25$, or the square of $18\frac{7}{8} = 356.2656$.

CUBES OF NUMBERS ADVANCING BY $\frac{1}{8}$ths.

No.	0	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$
0		.002	.016	.053	.125	.244	.422	.670
1	1	1.424	1.953	2.600	3.375	4.291	5.359	6.592
2	8	9.596	11.391	13.396	15.625	18.088	20.797	23.764
3	27	30.518	34.328	38.443	42.875	47.635	53.734	58.186
4	64	70.189	76.766	83.740	91.125	98.932	107.172	115.857
5	125	134.611	44.703	155.287	166.375	177.979	190.109	202.779
6	216	229.783	244.141	259.084	274.065	290.775	307.547	324.951
7	343	361.705	381.078	401.131	421.875	443.322	465.484	488.373
8	512	536.377	561.516	587.428	614.125	641.619	669.922	699.045
9	729	759.799	791.453	823.975	857.375	891.666	926.859	962.967
10	1000	1037.971	1076.891	1116.771	1156.625	1199.463	1242.297	1286.139
11	1331	1376.893	1423.828	1471.818	1520.875	1571.010	1622.234	1674.561
12	1728	1782.564	1838.266	1895.115	1953.125	2012.307	2072.672	2134.232
13	2197	2260.986	2326.203	2392.662	2460.375	2529.354	2599.609	2671.154
14	2744	2818.158	2893.641	2970.459	3048.625	3128.150	3209.047	3291.326
15	3375	3460.080	3546.578	3634.506	3723.875	3814.697	3906.984	4000.748
16	4096	4192.752	4291.016	4390.803	4492.125	4594.994	4699.422	4805.420
17	4913	5022.174	5132.953	5245.350	5359.375	5475.041	5592.359	5711.342
18	5832	5954.346	6078.391	6204.146	6331.625	6460.838	6591.797	6724.514
19	6859	6995.268	7133.328	7273.193	7414.875	7558.385	7703.734	7850.936
20	8000	8150.939	8303.766	8458.490	8615.125	8773.682	8934.172	9096.607

The above table gives the cube of any number between $\frac{1}{8}$ and $20\frac{7}{8}$; that is to say, the cube of 10 is 1000, or the cube of $10\frac{5}{8}$ is 1199.463.

WEIGHTS OF MATERIALS AND METALS.

Weights in lbs. of one Cubic foot.

Asphalte	155lbs.	Coke	40lbs.
Common Earth	95 to 125lbs.	Emery	250lbs.
Clay	135lbs.	Flint	164lbs.
Limestone	140lbs.	Glass (plate)	169lbs.
Coal (Solid)	80lbs.	Terra Cotta (Solid)	122lbs.
Coal (Loose)	52lbs.	Tar, Raw	11.7lbs.
Tar (Distilled) No. 1	11.2lbs.	Tar (Distilled) No. 2	11.4lbs
		Per Gallon	

METALS.

Milled Lead	711.5lbs.	Wrought Iron	480lbs.
Cast Lead	709lbs.	Tin	460lbs.
Copper	539.6lbs.	Cast Iron	450lbs.
Sheet Copper	548lbs.	Zinc	440lbs.
Drawn Copper	555lbs.	Bronze	512lbs.
Brass (Drawn)	524lbs.	Bell Metal	545lbs.
Steel	494lbs.		

THE NATURAL ANGLE OF REST FOR MATERIAL EXCAVATED.

Dry Sand, Sheltered	22 degrees	Clay	45 degrees
Wet Sand	38 ,,	Rubble or Mine Tips	45 ,,
Earth or Soil	30 ,,	River Shingle	40 ,,

BRICKS.—9in. x 4½in. x 3ins., average 8.4 lbs.
(Machine Commons), dry, 1000 = 8400lbs. = 75cwt.
1000 close stacked = 77 cubic feet.

RAILWAY FREIGHTS N.S.W., 1938.
(For Timber, etc.).

Not less than 8 tons or over	M Rate + 10%
2 tons to 8 tons	A Rate.
1 ton to 2 tons	B Rate.
Under 1 ton	1st Class Rate.

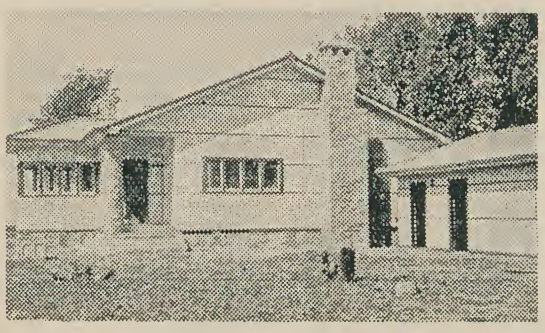
The above applies to all Split, Sawn, or Dressed Timber and the maximum length allowed is 27 feet in S Trucks.

APPROXIMATE WEIGHT OF TIMBER, &c.

Per ton Weight.

Hardwood	360ft. super	Cedar	700ft. super
Oregon	750ft. ,,	⅞ Baltic Flooring	1000ft. ,,
Kauri	750ft. ,,	¾ ,, Lining	1200ft., ,,
Redwood Dry	1000ft. ,,	½ ,, ,,	1600ft., ,,
5ft. Sawn H'dwood Palings,	400 count	Doors average	50 count
6ft. ,, ,,	350 ,,	Stock Sashes, av.	100 pairs.
Hardwood Pickets	500 ,,	Bricks, ordinary	300 count.

ASBESTOS CEMENT PRODUCTS.



Costs of upkeep are minimised by the use of asbestos cement, which, as a building material has in Australia, during the last twenty years become a necessity by virtue of its adaptability as a general purpose medium in all classes of constructions.

In the form of flat sheets, it is used for interior and exterior wallings, ceilings, eaves lining, gutter facings, etc. Accessories such as cover strips, angle and skirting mouldings serve to complete a satisfactory and workmanlike job.

A new departure in exterior treatment is followed by fixing the sheets horizontally, and for this purpose drip moulds are made in several shapes to carry the weathering down the face of the wall, and at the same time introduce a very pleasing decorative feature.

In the industrial and residential field the covering of large areas for roofing and walling of factories and similar premises, asbestos cement corrugated sheeting is now used and found to be entirely satisfactory. It can be fixed to girts up to four feet intervals, and its generally recognised waterproofing characteristics give a weatherproof finish to the structure under any climatic conditions.

Large corrugated sheets, 3′ 6″ in width and up to 10 feet long, with eight deep corrugations 3 inches in depth, have been developed expressly for long rafter runs needed for large factory and similar types of buildings. The depth of these corrugations adds considerably to the strength and enables the roof to carry the heaviest water loads without trouble.

Standard corrugated is found thoroughly satisfactory for smaller roofs with reasonable pitch. For both types of roofing every possible kind of accessory has been provided, such as two piece adaptable fluted ridge, capping hip ridge, gable end caps, side and end flashings for parapet fixings ; also ventilators of all sizes, skylights, gutters, rain heads, downpipe and a host of other special mouldings for every conceivable purpose.

Coloured roofing in both large and standard corrugations is now popular and a phone call to the manufacturers is all that is necessary

to secure fullest information regarding prices, and particulars of requirements for any construction whether plans are available or not.

ASBESTOS CEMENT FLAT BUILDING SHEETS.

Mode of erecting external sheeting.

For exterior and interior walls and ceilings, gable fittings, eave linings, partitions, balcony panels, etc.

It is fire-resisting, vermin and white ant proof, does not require painting and is easily sawn and nailed.

In lengths 4 to 10 feet, widths 2 to 4 feet. Crating is extra—3d. per yard with minimum 7/6.

Price.—For external walls $\frac{3}{16}$″ 2/1 square yard.
For internal walls $\frac{5}{32}$″ 1/10 square yard.
(*For further information, refer to maker's advt., pp.* 1, 3, 19.

Cover Moulds.

	Cover Moulds per 100 lin. ft.	External angles.	Internal angles.
$1\frac{1}{2}$″ wide x $\frac{5}{16}$″ thick, with rounded edges	9/–	18/–	—
2″ do. do. do. do. do.	10/9	21/6	21/6
$2\frac{1}{2}$″ do. do. do. do. do.	12/9	25/6	—
3″ do. do. do. do. do.	14/6	29/–	—

Picture Rail.—$2\frac{1}{2}$″ wide ; 15/6 100 lin. feet.
Top Capping or Finishing Mould.—$3\frac{1}{2}$d. per lin. foot.
Skirting Bevelled Edge.—6″ x $\frac{1}{2}$″, $6\frac{1}{2}$d. per lin. foot.
Oregon Cover Battens.—2 x $\frac{1}{2}$ 7/6 ; $2\frac{1}{2}$ x $\frac{1}{2}$ 9/6 ; 3 x $\frac{1}{2}$ 12/- 100 lin. feet.
Flat Headed Nails, Galvd.—1 x 14, 650 to 1 pound, 9d. per pound. Reckon 90 nails per square.
Special Stopping Cement.—2/– pound ; 7 lb. Tins, 10/6 ea.

EXAMPLE OF COST—PLAIN WALLING—ONE SIDE.

Per square.

	£	s.	d.
$11\frac{1}{9}$ square yards cement sheets $\frac{3}{16}$″ at 2/1	1	3	2
Labour per square, say		10	6
7/10 ft. lengths, 3 x 2 studding—2 ft. apart, fixed top and bottom plate—Dressed		17	6
90 nails			6
	£2	11	8
Net cost one side app. 4/9 sq. yd.			
If double-sided add extra sheets and labour	1	13	8
	£4	5	4

= 7/9 per sq. yd.

SUGGESTIONS FOR FIXING.

The Standards, Studs, or Battens, in order to give a level surface should be of equal thickness, and spaced accurately at 24 in. centres, with cross pieces nailed between the studs to receive the end of the sheets, butting together.

To make an even surface throughout, fill joints with Alabastine, ordinary cement mortar, or other slow setting plaster. Rub down with pumice powder and glass paper.

Otherwise the joints may be covered with wood fillets or other panelling material. Asbestos Cement Fillets 3 in. x $\frac{3}{16}$ in. thick may be used for a covering, the horizontal joints may be weathered with a thin flashing of zinc inserted.

Asbestos Cement Sheets can easily be cut with hand saw or deeply marked, or cut with chisel and straightedge and broken, or punctured along mark and roughly broken.

(*For further information refer to Advts. pp.* 1, 3, 19.)

Sundries.

Fibro Nails, 1 x 14 and 1¼ x 14 ... ... 49/3 cwt. or 7½d. pound.
Roofing Nails, Plain ... ... 53/6 ,, ,, 7d. ,,
,, ,, Twisted ... ... 57/3 ,, ,, 8d. ,,
Wire Nails : 10 gauge 1/10 ; 12 gauge 1/11 ; 14 gauge 2/1½d. (per 7-lb. packet.)
Nettlefold's Roofing Screws : 1 x 10 1/8 ; 1½ x 12 1/2 ; 1¾ x 12 1/1 pound.

DURATILE ASBESTOS CEMENT WALL TILE SHEETING.

Wunderlich asbestos cement Wall Tile Sheeting, prepared to represent 4″ x 4″ tiling. Ideal for lining walls of bathrooms, kitchens, shops, restaurants, corridors, also counter fronts.

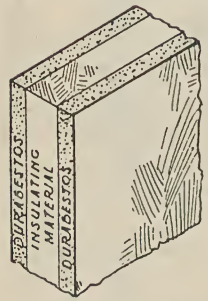
Supplied in stock sized sheets, 3′ and 4′ wide, by 4, 5, 6, 7, and 8′ long, by $\frac{3}{16}$″ thick (approximately).

Price, 5/3 per square yard (undecorated).

DURATILE ACCESSORIES (Asbestos Cement) similar in section to Sheets.

Internal and External Angle per lin. ft. 3½d.
(Cover Battens).
2″, 2½″, 3″ wide x 5/16″ thick, 1¾d., 2d., 2¼d.

Top Capping Mould, 3″ wide, 4d. per lin. ft. **Skirting,** with bevelled edge (6″ x ½″), 7d. per lin. ft.
lengths of 6ft. and 8ft.
Internal and External Angle.
Brass Unpolished, 9d. lin. ft.
Staybrite Unpolished, 1/9 lin. ft.
Polished, 2/– lin. ft.



Section Through Insulabestos Sheets

INSULABESTOS is a double-faced asbestos cement sheeting (faced on each side with $\frac{5}{32}$″ thick Durabestos), with a core of efficient insulating fibre. In sheets 3′ and 4′ wide, by 3, 4, 6, 7 and 8′ long.

Standard thickness is ¾″ (approx.).

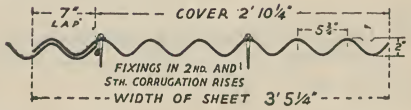
Prices on application.

(Made to order only.)

Refer Manufacturers Advt. pages 1 *&* 19.

"CORREBESTOS" CORRUGATED ROOFING.

Laying Large Corrugation.

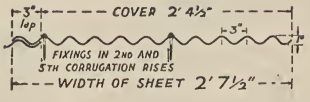


Large Corrugations.
Pitch 5¾″; Purlins Max 4′ centres.
Stock width for nominal 2″ or 7″ side lap, 3′ 5¼″; Net cover 2″ side lap, 3′ 3½″; Net cover 7″ side lap, 2′ 10¼″.

Stock lengths, 5′ to 10′ in 6″ intervals.
Approx. No. of sq. yds. per ton—uncrated 90
Price per sq. yard—uncrated 2/10

Standard Corrugations.

Pitch 3″ ; Purlins max. 3′ centres. Standard width, 2′ 7½″. Net cover with standard 1½″ corr. side lap, 2′ 4½″. Stock lengths 5′ to 10′ in 6″ intervals.



Approx. No. of sq. yds. per ton 100
Price per sq. yard, uncrated 2/7

The special qualities of asbestos cement make the sheets proof against rust or corrosion, acid fumes, alkalies, smoke, steam and dampness.

Used in covering roofs of dairy sheds, railway, wharf depots and wheat sheds, and roofs affected by sea air.

CURVED CORRUGATED SHEETS TO ORDER.

Any radius required.
Quotations on application.
(*Refer to advt., pp.* 3, 19.)

CORRUGATED ROOFING ACCESSORIES.

Roll Ridging—2 piece Plain. Adaptable to any pitch.
Length 6 feet. Net cover 5′ 6″ x 10″ x 10″, 1/- foot. Deep corrugated.
Net cover 5′ 6″ x 9″ x 9″. 11d. foot. Standard corrugated.

Roll Ridging—2 piece Fluted. Adaptable to any pitch.

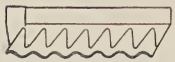
Length to suit 2″ or 7″ side lap, 12″ x 12″, 1/6 per lineal foot.
Length to suit standard corrugated sheets, 1/- per lineal foot.

Sawtooth Ridging—Set angle to suit roof.

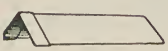
Length—Same as width of sheet according to lap.
Cover, 12″ x 9″. 1/- per lin. foot for Deep.
Cover 9″ x 6″, 10d. per lin. foot for Standard.

Fluted Apron Flashing—Width same as sheet according to lap.

Size 9″ x 3″ 8d. lineal foot, Deep.
6″ x 2″, 6d. lineal foot, Standard.



Plain Angular Ridging.



Length 6′. Net cover 5′ 8″.
Sizes 8″ x 8″ 9″ x 9″ 10″ x 10″
Lin. foot 8d. 9d. 10d.
Sizes 12″ x 12″
Lin. ft. 11d.

Side Flashing 6′ to 10′ Lengths.
3″ x 10″ x 2″ 8d. Lineal foot Deep.
3″ x 6″ x 1″ 7d. ,, ,, Standard.

Gutter Flashing. Length same as width of sheet according to lap.
9″ x 2″ 8d. Lineal foot Deep.
6″ x 2″ 6d. ,, ,, ,,
6″ x 2″ 6d. ,, ,, Standard.

Barge Capping 6′ to 10′ Lengths.
9″ x 8″ x 1″ 11d. Lineal Foot.
9″ x 4″ x 1″ 8d. ,, ,,
9″ x 2″ x 1″ 7d. ,, ,,

EAVES GUTTER.

6′ to 8′ Length.

4″	5″	6″	8″
1/–	1/1	1/3	1/6 foot.

BOX GUTTER.
Made to any Width—8′ Lengths.
Average Width 12″ x 6″ deep.
2/6 per lineal foot.

DOWN PIPE.

Lengths 6 feet including 4″ Collars.

3″ 1/– to 6″ 1/6 per lineal foot.
3″ x 2″ 1/– to 6″ x 4″ 1/6 per lineal foot.

GABLE END CAPS, 2/6. HIP STARTERS, 2/–. APEX PIECES, 5/–.

SKYLIGHTS FOR USE WITH CORRUGATED SHEETS.

Daylight Area 5′ 3″ x 1′ 6″, 44/– ea.
„ „ 3′ 3″ x 1′ 6″, 31/6 „
Glazed with ¼″ Wired Glass & Clips in 8ft. sheets.

Skylights

EXHAUST VENTILATORS—Roof Slope—in 8′ Sheet.

9″, 57/6 12″, 77/6 16″, 90/– 22″, 133/6 ea.
In addition to area covered by sheet at 2/10 sq. yd.

EXHAUST VENTILATORS RIDGE TYPE.

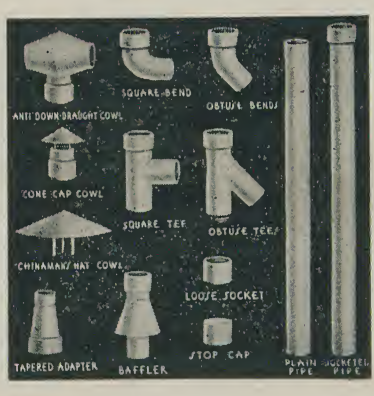
9″, 62/6 12″, 82/6 16″, 96/– 22″, 140/–.
Further particulars on application refer Advt., p. 3, 19.

ASBESTOS CEMENT.

FLUE PIPES AND FITTINGS.

For all Gas Appliances, Bath Heaters, Stoves, Etc.

Flue Pipes & Fittings



STOCK SIZES AND PRICES.

	2in.	3in.	4in.	5in.	6in.	8in.
Plain & Socketed Pipes	11d.	1/–	1/2	1/6	1/10	3/6 per lin. foot
Standard Lengths of Pipes :	Plain Pipes, 6ft.				Socketed Pipes, 6ft. 4ins. to cover 6 feet.	
Bends	2/9	3/–	3/6	4/6	5/6	8/6 each
Tees	3/6	4/–	4/6	5/–	6/–	8/6
Loose Socket	1/2	1/3	1/9	2/3	2/9	3/6
Anti Down-Draught Cowl	7/–	7/6	8/6	9/6	—	—
Baffler	9/–	10/6	12/–	13/6	16/–	—
Blank Cap	10d.	1/1	1/6	1/9	2/2	3/6
Cone and Hat Cowls	5/–	5/6	6/6	7/6	10/–	11/–

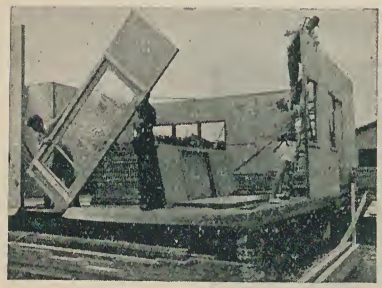
TAPERED ADAPTER.

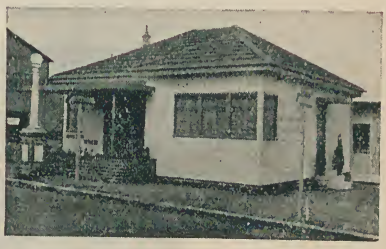
2in. to 3in., 2/–, 3in. to 4in., 2/2, 4in. to 5in., 2/6, 5in. to 6in., 3/–, 6in. to 8in., 5/6 each.

Refer Manufacturers Adv., p. 3.

PATENT STANDARDISED COTTAGES

VANDYKE BROS.





Complete made and fitted on bench in sections. Walls, doors and windows hung and fitted, 3 to 4 rooms, kitchen, bath, £180 to £250.

SPECIFICATION No. 2. . . . Is also for a complete home built by yourself and includes the following items :—

Foundation, 18 x 9 cement brick.

Brickwork and Steps, Hardwood Bearers and Joists, Cypress flooring to rooms, Hardwood flooring to verandahs, 3″ x 2″ Oregon studs at 12″ centres throughout, Casement windows, Glass doors to outside, 3 *automobile* lift up plate glass windows 3′ x 1′ 6″ with fly shutter, no weights.

Flush doors inside, Asbestos lined wall internally and externally, angle and cover moulds, Plain ceiling to rooms, Open eaves, Iron roof, Sink and drainer, Flat verandah to front, No. 8 Dover Fuel Stove, Fuel Copper, Tubs, Enamel rolled edge Bath, Electric light and power, Copper water service from main to footpath, Lead wastes, Draining in accordance with local council requirements (not sewer), Painting, Complete W.C. and Laundry.

Sectionite Cottages, £295 to £368.

COTTAGES—QUICK CONSTRUCTION.

HUDSONS.

Price on boat or rail.

Materials only, Ready Cut 4 room, Kitchen, and out offices, of Rusticated Matai, or Cham. & V. Redwood Weatherboards, with Verandah Plaster lined, Pine floor, from £295 to £340, 5 room, from £330 to £375.

Freight, foundation or drainage to be added to above which varies.

The erection of same 2 men, 6 weeks, at £12 per week, £72. Painting and cartage added.

Garages. 16′ x 10′ = £21, 18′ x 10′ = £23 5s. 0d., 18′ x 12′ = £25 5s.

MATERIALS PER SQUARE OF ROOFING.

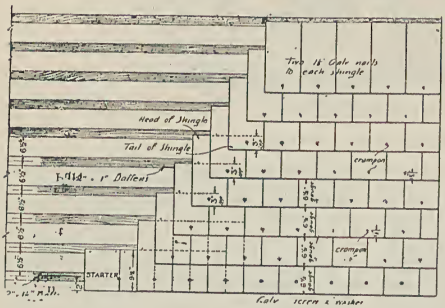
Shingles or Slates.

4in. lap, on 1½in. spaced Battens	16 x 16 diag.	12 x 12	16 x 8 Laid Square.	20 x 10	24 x 12
Quantity per square ...	100	535	280	170	115
1⅛in. x 13 g. gal. Slate nails	1lb.	5¼lbs.	2¾lbs.	1¾lbs.	1¼lbs.
Crampons required ...	100	nil	280	170	115
2in. x 1in. battens ...	170ft.	280ft.	200ft.	150ft.	125ft.
2½in. x 12 g., batten nails	1lb.	1½lbs.	1lb.	1lb.	¾lb.
Weight of one square ...	360lbs.	510lbs.	485lbs.	500lbs.	400lbs.

Diagonal Slating for A.C. Slates

ESTIMATE DETAIL FOR ONE SQUARE OF ROOFING.

-Sizes 16 ins. by 8 ins. and 12 ins. by 6ins.



	£	s.	d.
100 slates at £21 per 1,000	2	2	0
Oregon Battens, 141ft. run, 2in. x 1in., at 30/– 100 super ...	0	7	0
100 copper crampons at 22/– per 1000 — 2/3, clouts –/6	0	2	9
Labour to battens including slates, nails &c.	0	12	3
Nett ...	£3	4	0

SLATES AND ROOFING

Lap, Slates and Battens, required per square.

The slates, about 16in. x 16in. square, are laid diagonally, with a 2¾in., and 3½in., and 4in. lap, according to pitch of roof;

nailed at three corners with galvanised flat-headed nails and copper disc.

Lap of Slate.	Gauge of Battens	Battens per Square	Number of Slates.	Weight per Square.
2¾in.	... 9in.	... 133	... 85	... 246lbs.
3½in.	... 8½in.	... 141	... 97	... 270lbs.
4in.	... 7½in.	... 170	... 100	... 302lbs.

A.C. Slates laid, weigh 22lbs. per sq. yd.

Labour laying, 8/6 to 10/6 per square.

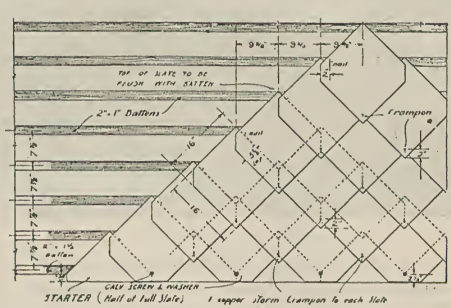
See Roof Tiler award for Labour Rates. *Roof Tiler Section.*

First Course of Slates.—It will be noticed that, as regards the Slates of the first course, it is usual to trim off the bottom of each Slate so as to preserve a continuous straight line with the starters.

Stock Ridging in 2 pieces.
6in. x 6in., per ft. run, 10d.
8in. x 8in., per ft. run, 1/–.
9in. x 9in., per ft. run 1/1.

Labour fixing Ridging. 3d. per foot run, add mortar and cement, 3d. — 6d. net.

If crating is used for slates or sheets, add 3d. per sq. yd.



Plastic Asbestos for covering boilers of engines and tanks and hot water heaters, etc., also ice sheets, **quantity required** to be applied in three consecutive coats, till 1¼in. thick, after painting the iron or copper with a thin coat hot.

Everseal is a paint for waterproofing gal. iron, cement roofs made from Asbestos and Bitumen or Asphalte, price 1 lb. tin, 1/6.

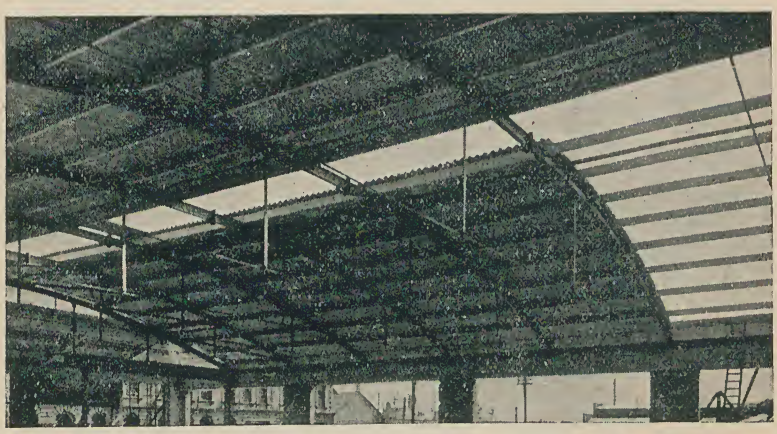
CURVED R.S. JOISTS

THE S.S. (Stanley Streamlined) ROOF

This roof principal is of steel and is based on the basic principles of engineering design and construction, it is an Australian Patent and is ideal for Australian conditions, it is designed to resist heavy wind loads and the manufacturers of asbestos roofings, have specialised in the manufacture of the **curved asbestos sheets.**

The steel used is produced by BHP and is of the standard rolled steel sections and it is particularly applicable to large single spans such as are required by Industrial and airport constructions. With clear span of say 100 feet and a spacing of 15 feet to 20 feet.

The weight of steel saved by the **Stanley Truss** is 55% as compared with the usual steel truss of the same span and spacing.



This Principal has been extensively used in Hanging Theatres, Garages, Sugar Mills, Warehouses and the like. For big spans it has proved an unqualified success and **costs** approximately 25% cheaper than any other steel principal roof.

The greater the span the greater % of saving. *For further information and costs apply* Malcolm Stanley structural engineer of Sydney, the designer and inventor.

Extract from letter K. M. Fletcher, 1938.

A triangulated member of the usual steel type roof principal for a span 100 feet weighs approx. 3¾ tons on SS Principal of the same span and conditions would weigh 1¼ tons, over 100 feet span with purlins and Cor. Sheets, from £8 to £10 per square, up to 80 feet span, £5 to £6 per square.

ASBESTOS CEMENT PRODUCTS.

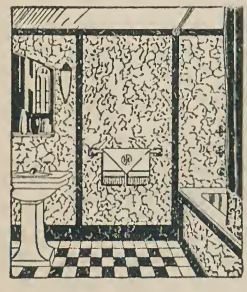
Tilux—Marble finished Wall Panels in various colours—sizes range from 3ft. x 1ft. to 8ft. x 4ft., price, 7/9 sq. yard—uncrated.

Velotile—Asbestos Cement Wall Tile Sheeting, for wainscoting to walls of Bathrooms, Kitchens, Pantries, etc., price 5/3 per sq. yard.

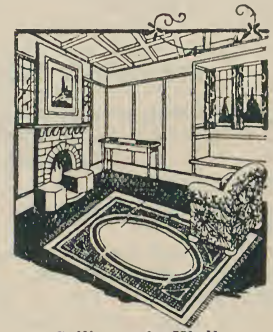
Necessary cover moulds and fixing extra.

"LUMEX" (Regd.) Metal Mouldings.

For covering joints and edges of "TILUX" Marble-finished Wall Panels and "VELOTILE" Sheets. Manufactured in sections as illustrated hereunder.



TILUX Walls in Bath Room



Ceilings & Walls Asbestos Cement Sheets

LABOUR COST OF PANELLED CEILING.

If sheets are used as a ceiling, with joists 2 feet apart showing, dressed in room, plain panelling nailed on top of joists, the net cost complete would be from 8/– upwards per super yard.

Example.—**Labour only. Lining** to verandah ceiling 75ft. x 12ft. wide under **street awning** in two 6ft. x 3ft. wide sheets.

Fixing five sets of 4 x 2 oregon bearers between eight steel framed cantilever T iron beams, fixing sheets with 5 x 1 oregon cover pieces over joints and ends to inserted cross bearers, erecting temporary scaffolding, etc., clearing up at finish. The above ceiling contains 100 square yards.

Labour only. Two men, three days = 157 shillings.

Plain large surface or a little over 1/6 per square yard, fixing alone.

Fixing bearers and sheets worth 2/– per square yard = net cost of tradesman. Add for cartage, incidentals, 6d. per square yard.

ASBESTOS CEMENT.

It requires about 25lbs. to cover 1½ sq. yards or a tank 3ft. x 18in. diam., 1¼in. thick, 50lbs. to cover 4ft. 6in. x 2 ft. dia. boiler.

In bags, 50lb., 75lbs., and 100lbs., at 20/–, to 30/– per cwt.

Asbestos Roofing Felts are also made—a sandwich of bitumen felt with asbestos fibre covering, price per roll of 12 yards, 40/–.

Saturated felt, in rolls 500 sq. feet to roll, 19/6 roll.

Water Paint, for sheets, in 28 colours, 7lb., 4/9.

Petrifying Liquid, to add if necessary, 7/3 per gallon.

Interior, 1 gal. to 56lbs., exterior use, 1 gal. to 28lb. paint.

7lbs. 1 coat of 45 sq. yards, 2 coats 25 sq. yards.

Asbestos Composition for cement boilers and hot water, in bags, 20/– and 30/– per cwt.

NON CONDUCTOR OF HEAT AND SOUND.

Arctic Packing, prepared of seaweed, per ¼ cwt. bale, 43/–. Will cover 250 sq. feet 4 inches thick.

CARTAGE ON ASBESTOS CEMENT SHEETS.

Prices quoted include cartage in the suburban districts as far as **Mona Vale, Mt. Kuringai, Quakers Hill, Rooty Hill, Ingleburn and Engandine.** Also free on rail or free on Boat Sydney.

Beyond these points the following extra charges for delivery will be made :—

	per sq. yard
Beyond Mona Vale, to Bayview, Church Point and Avalon	1d.
,, Avalon to Palm Beach	2d.
,, Mt. Kuringai to Cowan	1d.
,, Cowan to Hawkesbury or Peats Ferry	2d.
,, Quakers Hill to Riverstone	1d.
,, Riverstone to Richmond	2d.
,, Rooty Hill to St. Marys	1d.
,, St. Marys to Emu Plains	2d.
,, Ingleburn to Campbelltown	1d.
,, Cross Roads to Camden	2d.
,, Engandine to Waterfall	1d.
,, Waterfall to Helensburgh	2d.
,, the above areas, delivery charge by road to be in accordance with actual cost incurred with a minimum of 2d. per sq. yard.	

ASPHALTE

The term " asphalte " is commonly applied to any tar or bituminous mixture, of whatever origin, and it is therefore always prefaced with some qualifying word or phrase according to the purpose for which it is required.

The asphalte used in Building Construction is known as **Mastic Asphalte,** and may be divided into three main classes—Roofing, Flooring and Dampcoursing. A first grade mastic asphalte is composed of natural rock asphalte, native lake bitumen and local aggregates, the percentages of each varying with the class of work required. Mastic asphalte is absolutely imperishable, and is impervious to water.

The main sources of rock asphalte are Switzerland (Neuchatel or Val de Travers) France (Seyssel) Italy (Scafa) and Germany (Limmer). The main source of supply of native lake bitumen is Trinidad B.W.I.

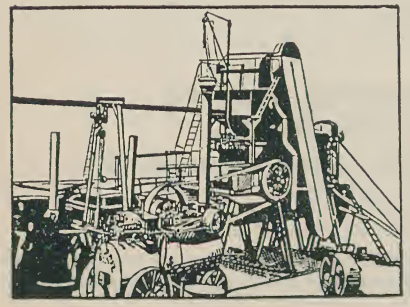
Mastic asphalte is spread by means of wooden floats to the thickness desired, usually in two coats, but in wet situations at least three coats are advisable. The thickness required for roofing is $\frac{3}{4}''$ to $1''$, for flooring $\frac{3}{4}''$ to $1\frac{1}{2}''$ and for dampcoursing $\frac{1}{2}''$ to $\frac{3}{4}''$.

Mastic Asphalte Roofs, Floors, etc.

Prices per super yard, laid complete. (On concrete).		Melbourne or Sydney.
Roofing—$1''$ in 2 coats	... ...	9/–
$\frac{3}{4}''$ in 2 coats	... ...	8/–
Flooring—$1\frac{1}{2}''$ in 2 coats	... ...	12/–
$1\frac{1}{4}''$,,	... ...	10/–
$1''$,,	... ...	8/–
$\frac{3}{4}''$,,	... ...	7/–
Dampcoursing—$\frac{3}{4}''$ Vert. in 3 coats	... ...	7/–
$\frac{1}{2}''$,, in 2 coats	... ...	4/6
$\frac{3}{4}''$ Hor. in 2 coats	... ...	5/6
$\frac{1}{2}''$,, ,,	... ...	4/–

Supplying only.

Rock Asphalte, in $\frac{1}{2}$ cwt. blocks, £7/10/– to £9/10/– ton.
Trinidad Lake Bitumen, in $4\frac{1}{2}$ cwt. barrels, £11/10/- to £12/10/- ton.



Labour required in preparing and spreading.

For roofing or Flooring, 6 men working an $8\frac{3}{4}$ hour day, can prepare and spread four to five tons of mastic $1''$ thick, using cauldrons of 10 cwt. capacity. The approx. weight of the mastic $1''$ thick is 1 cwt. per square yard.

Paints and Compounds, etc.

	1st grade.	2nd grade.
Bituminous Paint, black in 1 or 4 gallon tins	7.6 gal.	4.6 gal.
Aluminium (Bituminous Base) Paint—in 1 or 4 gal. tins	17.6 gal.	
Marine Glue, in 56-lb. tins	25.0 cwt.	

Roofing Felts.

in 2-square rolls = 24 sq. yards 72′ x 3′	1 ply	2 ply	3 ply	5 ply	Mineral Surfaced 3 ply
Genasco (imported) ...	32/6	40/–	45/–	50/–	50/–
Ormonoid	26/6	32/–	38/–		
Malthoid	30/6	37/6	44/9		
Maltha	26/6	32/–	38/–		
Ormonoid (Challenge Quality)	25/9	31/–	36/6		

Footways and Pavements.

A first-class job carried out in **Sheet Asphalte** calls for complete equipment, including a light power roller, but a good job can be made with a minimum of gear, provided full instructions are first obtained from a reputable contractor, and his instructions carefully followed. The Sheet Asphalte delivered in the Metropolitan area, in 3-ton loads, would cost from £2/5/– to £2/10/– per ton, and has a covering capacity of 40 sq. yds to the ton ½″ thick, or 20 sq. yards 1″ thick.

Prices supplied and laid complete (surfacing only) for a reasonably sized job would range from 3/– per sq. yard ½″ thick, and any solid filling, well compacted, makes an ideal base.

Further Information on Application, see Advt., p. 11.

Asphalte for Roads—See Roads.

OTHER BITUMINOUS MATERIALS

Used as Floor Coverings.

(Ideal for Floors of Offices, Garages, Bathrooms, Etc.).
Sentinel Red Med. Weight 53/6 Heavy 68/6 roll.
,, Green ,, 68/6 ,, 85/6 ,,
Also Ormonoid, and Malthoid, at Manufacturers List prices.

A layer of gal. iron wire netting, large mesh, stretched tightly over rafters or battens, form a very good and cheap support for these roofing felts.

WATERPROOF AND SEMI RIGID BOARD.

"S.K." 9 ply Reinforced Wall Board for ceilings 13/6 per 100 sq. ft.
18 ply Rigid and Waterproof for Walling, $\frac{1}{16}$" thick ... ... 28/6 ,,
$1\frac{1}{2}$ x 16 g. Gal. Hoop Iron ... ... 47/6 cwt.
1" Compressed Granulated Cork ... ... 10d. per sq. ft.

	$4\frac{1}{2}$"	9"
Asphalte Dampcourse 30 ft. rolls	2/9	5/6 roll

	$4\frac{1}{2}$"	9"	$13\frac{1}{2}$"	18"
2lb. Lead Covered Dampcourse per 20ft. rolls	6/6	13/–	19/6	26/–

Lead Subject to Market Fluctuations.
2 Ft. sisalkraft bldg. paper 60/60 ... 9/9 per 100 sq. ft.

TAR PAVEMENTS

Material necessary for 10 sq. yards, 3 in. thick. s. d.

14 gallons of Tar to 1 ton of metal screenings, mixed to 90 degrees is sufficient.
40 gallons of tar will mix 5 tons of blue metal shivers, $\frac{3}{4}$ gauge.
N.B.—Tar required for 6in. tar concrete paving, viz., 3in. of 2in. metal, tarred after spreading, 2in. smaller metal mixed with tar, topped with 1in. tar and coke dust, requires from $1\frac{1}{4}$ to $1\frac{1}{2}$ gallons per super yard. (See Road Making).
Tar per gallon at Gas Works: Melbourne, 9d., Sydney ... 0 6
Cost of Containers and Cartage to be added.

TAR-CONCRETE OR COMPOSITION PAVEMENT.

		s.	d.
Namely, $2\frac{1}{2}$in. or 2in. bluestone metal foundation, 1in. coarse, and $\frac{1}{2}$in. fine screenings, the whole mixed with tar, and dusted over with bluestone dust.	$2\frac{3}{4}$in. thick ...	5	6
	4in. thick ...	7	0
	5in. thick ...	9	0
	6in. thick ...	12	0
Painting with hot tar and sand, per super yard, at $7\frac{1}{2}$d. gal. ...		0	11
1in. Tar and Sand Top-dressing and Rolling, fine top		2	0
3in. Tar concrete footpaths, with gravel foundation covered with 1in. tarred blue metal screenings		4	6

TARRED ASH PAVEMENT.

Example Materials Required.

20 square yards, $1\frac{1}{2}$ inches thick when rolled

One load ashes	6	0
20 gallons tar at works, 6d.	10	0
1 mile cartage	4	6
Materials—Net cost	20	6

Add labor, spreading and rolling.

N.B.—If on clay foundations, spread 2 inches of dry ashes to prevent cracking.

Prices, Retail.

Coal Tar, retail 8d. per gallon. (Containers Extra).

COST OF LAYING ROOFS, PAVINGS AND STREETS.

1 in. Thick, Labour Only.

	per sq. yd.
Price for large surfaces, from	1/6 to 2/–
For Roofs, about 200 sq. yds. and 40 to 50 ft. above pavement, from	2/– to 2/6
Taking up old asphalte paving, 4in. thick, and removing debris 30 feet, add	–/9
Taking up old blue metal tar-paving up to 4in. ditto ...	–/8
Taking up old cinder tar-paving ditto	–/6
Loading debris into cart, per cubic yard load, from ground	–/8
Dumping	–/2
2¾in. Tarred Ash paving, per square yard	4/–

Foundation 2in. tarred ashes; 1in. blue metal screenings rolled to ¾in.

It requires 33 gal. of tar for 1 cubic yard of ashes or coke screenings.

All tables throughout this work have been carefully compiled from existing sources of information and are those in general use throughout the various sections of the trades.

No originality is claimed—nor responsibility accepted.

The Editor.

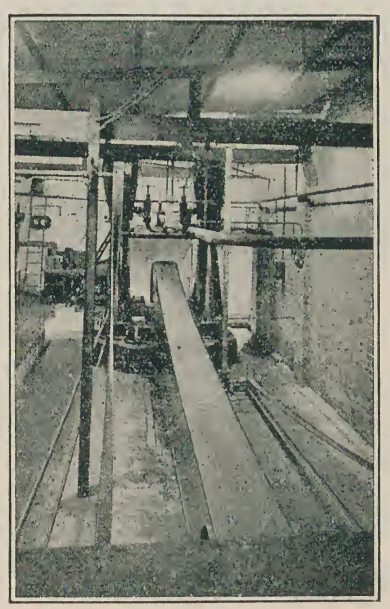
BELTING

Power transmission belting may be obtained in leather, rubber and cotton fabric, and roller chain to suit various transmissions.

LEATHER BELTING.

Per foot run. Width—Inches	1½	2	3	4	6	9	12
Single							
Light ⅛″ thick	1/3	1/8	2/6	3/4	—	—	—
Medium $\frac{5}{32}$″ thick	1/5½	1/11	2/10½	3/10	5/9	8/7½	—
Heavy $\frac{3}{16}$″ thick	1/9	2/4	3/6	4/8	7/–	10/6	—
Ex. Heavy ¼″ thick	2/3	3/–	4/6	6/–	9/–	13/6	—
Double							
Light ¼″ thick	—	—	5/–	6/8	10/–	—	—
Medium $\frac{5}{16}$″ thick	—	—	5/9	7/8	11/6	17/3	23/–
Heavy ⅜″ thick	—	—	7/–	9/4	14/–	21/–	28/–
Ex. Heavy ½″ thick	—	—	9/–	12/–	18/–	27/–	36/–
Three-Ply							
Medium $\frac{7}{16}$″ thick	—	—	—	11/4	17/–	25/6	34/–
Heavy $\frac{9}{16}$″ thick	—	—	—	14/–	21/–	31/6	42/–

See advt. page 8a, *for further information.*

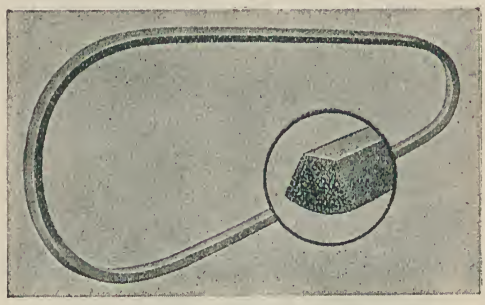


RUBBER—FLAT SURFACE.

This belting is manufactured by impregnating duck fabric with rubber; made in two grades, general service and heavy duty for intermittent loads or sudden applications of power.

GENERAL SERVICE.

Per foot run Width—Inches	1½	2	3	4	6	9	12
2 Ply	7d.	8½d.	11½d	1/2	—	—	—
3 Ply	8½d.	10½d.	1/2½	1/5	—	—	—
4 Ply	11d.	1/0½	1/6½	2/–	3/4	—	—
5 Ply	—	—	2/–	2/7	3/10	6/1	7/8
6 Ply	—	—	—	3/4	4/5	6/9	8/9
Heavy Duty.							
3 Ply	—	—	1/5½	1/8	—	—	—
4 Ply	—	—	1/11	2/5	3/11	—	—
5 Ply	—	—	2/4½	3/1	4/8	7/3	9/3
6 Ply	—	—	—	3/11	5/4	8/2	10/5
8 Ply	—	—	—	—	—	9/11	13/1



for further information see advt., page 16a.

WEDGE BELTING.

This belting of rubber and cotton is made in the shape of a wedge which fits into a wedge shaped groove in the pulley wheel. This gives more surface area of grip than the flat surface belting.

It is efficient in horizontal and vertical as well as slack and tight transmissions. It does not shrink or stretch and is impervious to water.

Made in five sizes from ½″ x $\frac{11}{32}$″ to 1½″ x 1″. The number and size of wedge-belts used on pulley wheel depends on the power to be transmitted.

Sold under the trade names of " Wedgeropes " and " Vulco-ropes." Procurable as endless belts.

Size A	30″	circumference to	120″	...	...	...	7/– to 16/– each
,, B	44″	,, ,,	300″	...	...	...	9/6 to 79/– ,,
,, C	48″	,, ,,	360″	...	...	...	15/– to 108/– ,,
,, D	101″	,, ,,	360″	...	...	...	42/6 to 155/– ,,
,, E	180″	,, ,,	300″	...	...	...	106/9 to 176/– ,,

RUBBER COVERED $\frac{1}{8}$″ TOP SIDE $\frac{1}{32}$″ PULLEY SIDE.

Per foot run

Width	3 Ply	4 Ply	5 Ply	6 Ply	7 Ply	8 Ply
6 Inches	5/–	5/8	6/3	7/4	8/2	9/5
9 ,, ...	6/1	7/2	8/2	9/3	10/5	11/6
12 ,, ...	7/3	8/7	10/–	11/6	12/11	14/7
18 ,, ...	—	11/10	14/–	15/11	17/10	19/8
24 ,, ...	—	15/9	18/–	20/4	22/4	24/4

RUBBER COVERED $\frac{1}{8}$″ TOP SIDE $\frac{1}{16}$″ PULLEY SIDE.

Per foot run

Width	3 Ply	4 Ply	5 Ply	6 Ply	7 Ply	8 Ply
6 Inches	5/2	5/10	6/6	7/6	8/5	9/7
9 ,, ...	6/8	7/6	8/4	9/6	10/9	11/8
12 ,, ...	7/7	9/–	10/5	11/10	13/3	14/11
18 ,, ...	—	12/6	14/7	16/5	18/4	20/2
24 ,, ...	—	16/6	18/8	21/–	23/2	25/2

RUBBER COVERED $\frac{1}{8}$″ TOP SIDE $\frac{1}{8}$″ PULLEY SIDE. OR $\frac{3}{16}$″ TOP SIDE $\frac{1}{16}$″ PULLEY SIDE.

Width	3 Ply	4 Ply	5 Ply	6 Ply	7 Ply	8 Ply
6 Inches	5/7	6/2	6/10	7/10	8/9	9/11
9 ,, ...	6/11	7/11	9/1	10/–	11/3	12/3
12 ,, ...	8/4	9/8	11/2	12/8	14/–	15/8
18 ,, ...	—	13/6	15/8	17/6	19/6	21/4
24 ,, ...	—	18/–	20/2	22/6	24/6	26/7

CONVEYOR BELTING.

Rubber and Cotton fabric are the basic materials used for the manufacture of Conveyor Belts.

RUBBER COVERED $\frac{1}{16}$″ TOP SIDE $\frac{1}{16}$″ PULLEY SIDE.

Per foot run

Width	3 Ply	4 Ply	5 Ply	5 Ply	7 Ply	8 Ply
6 Inches ...	4/10	5/6	6/1	7/2	8/–	9/3
9 ,, ...	5/10	6/10	7/11	9/–	10/2	11/2
12 ,, ...	6/10	8/2	9/8	11/2	12/7	14/3
18 ,, ...	—	11/4	13/5	15/3	17/2	19/–
24 ,, ...	—	15/–	17/2	19/8	21/8	23/8

See Dunlop Perdriau Rubber Co. Ltd. advt., page 16a.

WAGES IN THE BUILDING TRADE

STATE AWARDS—N.S.W.—1938.
44 Hours.

	per Hour.
Builders' Labourers	2/4¾
Bricklayers and Tuckpointers	2/9 15/22
Carpenters and Joiners	2/9 15/22
Painters (House and General)	2/6 7/11
Plasterers	2/9 15/22
Plumbers and Gas Fitters	2/9½
Slaters, Tilers and Shinglers	2/9 7/11
Stonemasons	3/1 19/20

The above refers to rates payable in Sydney, Newcastle, Port Kembla and Wollongong.

Elsewhere are slightly less and employers should refer to the Award for Country Areas.

For information re Insurance, see adv. p. 26 and Article under Legal Notes.

PRICES OF MATERIALS, N.S.W.

Bricks common at kiln, per 1000	65/–	
plus cartage according to distance and location.		
Timber—		
Hardwood 2in. x 2in., 8 to 21ft. per 100 super ...	32/6	
,, 3in. x 3in., 8 to 21ft. ,, ,, ,, ...	31/–	
Oregon 2in. x 2in. and up to 12in. x 6in. in lengths to 24ft.	38/–	upwards
,, ditto over 24ft.	40/–	,,
Baltic Flooring Best Selected 6 x ¾	58/–	,,
6 x ⅞	62/–	,,
N.Z. Matai Flooring	44/–	

Cement, 1 to 11 Bags 5/– Bag, ½ ton and over £5 ton.

All of the above prices with the exception of Cement are ex yard—Cartage extra. Cement—City delivery only.

S.A. INSTITUTE OF SURVEYORS (Incorporated).

MINIMUM FEES FOR SURVEY WORK.

The following minimum rates have been adopted by the Institute of Surveyors under the provisions of the Licensed Surveyors Act, 1915.

Field work £5/5/– per day, 8 hours. Travelling time 12/– per hour (maximum £4/4/– per any one day). Car mileage, 6d. per mile—Surveyor's own car.

Office work. Searching, preparation of plans, calculations, etc., 12/– per hour.

City surveys, including certified plans, minimum £6/6/–.

Identification surveys as required by financial institutions, min. £3/3/–.

Minimum charge for any survey, £3/3/–.

Township sub-divisions :—

Preliminary field work, £5/5/– per day, and office work, £4/4/– per day.

Pegging subdivision in addition as under :—

1 acre, £10/10/–, 2 acres, £12/12/–, 3 acres, £14/14/–, 5 acres, £18/18/–, 10 acres, £26/5/–.

20 acres, £40/–/–, 40 acres, £75/–/–, 80 acres, £135/–/–, 100 acres, £165/–/–.

All surveys required to be permanently marked.

Out of pocket expenses added.

SOUTH AUSTRALIAN BUILDING PRICES.

Insulite Wood Fibre, insulating board $\frac{1}{2}$″ thick, 31/6 per 100 s. ft.
" " " " " $\frac{3}{8}$″ thick 26/– per 100 s. ft.

Oregon merchantable sawn, from 1″ to 3″ thick, up to 4 inches wide. 9′ to 30′ at 42/– per 100 ft. super.

Oregon 1in. thick to 9in. thick x 12in. wide to 31 to 40 ft. long, 44/– per 100 ft. sup.

Oregon from 1$\frac{1}{2}$in. thick to 9in. thick, 30 ft. to 40 ft. long, 44/– per 100 ft. sup.

Hardwood, scantlings up to 4″ x 3″, 43/– to 47/6 per 100 s. ft.

Jarrah and Red Gum shorts scantlings to 4″ x 3″ = 41/– to 6″ x 4″ 48/–.

100 Palings, 5 ft. 41/6, 6 ft. 46/6, per 100 count, less price for quantities.

Flooring Rimu 6″ x $\frac{7}{8}$″, 25/6 per 100 ft. run. Karri flooring, 4$\frac{3}{8}$″ x $\frac{13}{16}$″, 26/9 per 100 ft. run. Hoop Pine, 6″ x $\frac{3}{4}$″, 28/– at yard, Adelaide.

CEMENT.

KANGAROO CEMENT.

Delivery.	1-12 bags.	13-24 bags	25-47 bags	48 bags & over
At Works, Birkenhead	4/5	4/4	4/1	3/9
Port Adelaide & Glenelg District	4/6$\frac{1}{2}$	4/5$\frac{1}{2}$	4/2$\frac{1}{2}$	3/10$\frac{1}{2}$

"RAPIDITE."

Rapid Hardening Cement paper bags: 4 equal to one cask; 24 equal one ton.

City and Metropolitan Area & F.o.b.	1 to 12 Bags	13 to 24 Bgs	25 to 47 Bgs	48 Bags and Over
	4/8	4/7	4/4	4/–

USEFUL CALCULATIONS TO CONVERT ITEMS.

To Convert—	*Multiply by*
Inches to centimentres	2·5400
Yards to metres	0·9144
Feet to metres	0·3048
Miles to kilometres	1·6093
Square inches to square centimetres	6·4516
Square feet to square metres	0·0929
Square miles to acres	640·0000
Cubic inches to cubic centimetres	16·387
Cubic feet to cubic metres	0·028316
Cubic yards to cubic metres	·764532
Pounds to kilogrammes	0·45359
Pounds per foot to kilogrammes per metre	1·4881
Pounds per square foot to kilogrammes per square metre	4·88
Feet head of water to pounds per sq. in.	0·432
Atmospheres to pounds per square inch	14·73
Miles per hour to metres per second	0·44703
Horse-power to foot-pounds per minute	33000
Horse-power to kilowatts	·746
Horse-power to gramme-metres per sec.	76040
Horse-power to force de cheval	1·014
Kilowatt hours to horse-power hours	1·34
Foot-pounds to joules (watt-seconds)	1·355
Foot-pounds to gramme calories	·324
Gramme calories to British Thermal Units	·00397
British Thermal Units to therms	10^{-5}

Water weighs 10 lb. per gallon, 62·3 lb. per cubic foot, 0·036 lb. per cubic inch.

Ice weighs 57 lbs. per cubic foot, 0·033 lb. per cubic inch.

LENGTHS OF A FOOT IN DIFFERENT COUNTRIES.

	Eng. Ins.		Eng. Ins.		Eng. Ins.
Spain	11·03	Denmark & Norway	12·35	Portugal	12·96
Holland	11·14			Russia	13·75
Sweden	11·69	Germany	12·36	France, metre	39·37
America	12·00	Austria	12·45		

LENGTHS OF A MILE IN DIFFERENT COUNTRIES.

	Eng. Yds.		Eng. Yds.		Eng. Yds.
Russian	1100	Irish	2240	Swedish & Danish	7233
Italian	1467	Polish	4400	Hungarian	8630
English	1760	Spanish	5028	Norwegian	12400
Scotch	1984	German	5826	French League	3666

CONTENTS IN GALLONS PER FOOT OF DEPTH.

Ft.	Ins		Ft.	Ins.	
3	0 dia.	44 gallons	6	0 dia.	176 gallons
3	6 ,,	60 ,,	7	0 ,,	240 ,,
4	0 ,,	78 ,,	8	0 ,,	314 ,,
4	6 ,,	99 ,,	9	0 ,,	397 ,,
5	0 ,,	123 ,,	10	0 ,,	490 ,,

BUILDING BOARDS.

Cane-ite.

Thickness	Size	No. in Package	Surface Measurement	Per 100 Sq. feet.
$\frac{5}{16}$″	8 x 3	14	336 sq. feet	25/–
	10 x 3	14	420 ,, ,,	25/–
$\frac{1}{2}$″	6 x 3	10	180 ,, ,,	32/–
	8 x 3	10	240 ,, ,,	32/–
	10 x 3	10	300 ,, ,,	32/–
	12 x 3	10	360 ,, ,,	32/–

Masonite.

		per 100 sq. ft.
$\frac{1}{8}$″ Presdwood	Sheets 8′ 9′ 10′ 12′ x 4′	42/6
$\frac{1}{4}$″ Presdwood	,, 12′ x 4′	76/3
$\frac{1}{8}$″ Tempered Presdwood	,, 8′ & 10′ x 4′	52/–
$\frac{5}{16}$″ ,, ,,	,, 12′ x 4′	111/6
$\frac{1}{4}$″ Quartrboard	,, 8′ x 4′ & 12′ x 4′	30/–
$\frac{1}{8}$″ Temprtile	,, 12′ x 4′	65/6

Note.—These prices apply only to the present stocks of imported **Masonite.**

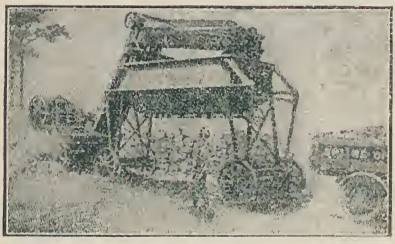
It is considered that when the Australian Masonite Factory goes into production in Oct./Nov., 1938, and local supplies become available, substantial reductions in price will be effected.

See Distributors Advt. p. 22.

BALLAST AND METAL

PRICES.

Subject to Fluctuation.



Stone Portable Crushing Screening and Loading Hopper Plant. A stone Breaker with 16 x 9 inch jaws, cost, from £225, Petrol, Oil Engine or Electric driving Power, = to a ¾ h.p. engine. Will break 1 ton per hour.

Clearance 6ft. to 9ft. underneath.

Portable plants from 4 tons to 18 tons per hour capacity, and **stationary** plants up to 40 tons per hour. This combination is sometimes employed in Australia by municipalities and shires.

Capacity stone crushed : **Portable,** 6 to 10 tons per hour ; **Stationary** 60 to 80 tons per 8-hour day. £860. Mounted on all steel carriage.

Amalgamated Blue Stone Quarries, Machine Broken

	Ex Hoppers	City Delivery
2½in. metal	11/6	13/–
1½in. metal	11/6	13/–
¾in. metal	12/3	14/9
¼in. metal with dust	12/6	14/6
5/16in. metal without dust	12/9	14/9
Spalls	10/–	12/–
Broken (earthen) pipes for concrete, per single load	...	8/–
Waste bricks or clinkers from brick kilns	...	6/6

HORNSBY QUARRIES.	F.O.R. Hornsby Per Ton.
¾in. Breccia Screenings	12/3
1½in., 2½in. gauges Road Metal	11/6
¼in. Ballast Screenings, including dust	12/–

Melbourne Bluestone, 2½ and 1½ gauges, 11/6 to 12/6, delivered on jobs Melbourne ; ¾ gauges, 14/6.

COARSE RIVER SAND AND GRAVEL.

Emu Plains, Nepean River.

	s.	d.
Nepean River Screened Sand, per ton		
On Truck at Emu Plains	5	0
On Truck, Darling Harbour	8	0
On intermediate suburban stations	8	0
On Truck North Sydney Station	8	6
Motor Cartage within 1 mile of line	3	6
Screened Sand, Melbourne, city delivered	8	0

HAND-BROKEN ROAD METAL.

Labour only, per Cubic Yard.

Wages of Stonebreaker, 2/3 per hour.

	per c. yard. s.	d.
Bluestone or trap rock, broken to a 2½in. ring gauge ...	7	6
White metal	5	6
If hard sandstone, gritstone, brick or quartz	5	0
Wheeling and spreading within 60 feet	2	6

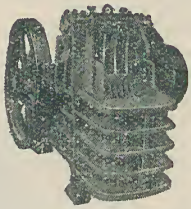
WEIGHT OF RUBBLE ROAD METAL, Etc.

	p. cu. yd. cwt.	cu. feet per ton.
Granite Rubble	30	18
Bluestone rubble	29	20
Sandstone rubble	28	19
2½in. Bluestone Metal	26	24–26
2in. Bluestone metal	25	25–27
2½in. Sandstone metal	24	22½
2in. Sandstone metal	23	22
Sand or fine gravel ballast	22½	24
1in. Bluestone screenings	23	27–28
Small Coke or Breeze	12	41
Shingle or Old Mortar	21½	25
Mortar, new	19	28

STONEBREAKING MACHINES will break from 6 cubic yards of 2½in. ring gauge bluestone per hour, with two men to supply the stone, etc., at about 2/–.

If spalls or small rubble can be obtained at a quarry within a mile of the machine, 2½in. ring gauge bluestone metal may be supplied and loaded into drays or motor lorry at a cost of 9/– per cubic yard.

STONE CRUSHERS



CRUSHER.

No. 1-B. Crusher, weight 2200lbs., capacity about 25 tons 2½in. metal per day of eight hours. This Crusher would require 4 to 6 h.p. to drive it.

It is fitted with extra pair of Jaws and a Toggle Plate, price approx. £200 net cash f.o.b. or f.o.r. Sydney.

In measuring ballasting for railways or tramways, the sleepers should be deducted for net measure.

CLAY PUDDLE.

Per cubic Yard.

Wages of laborer, 2/1 per hour, with use of tools.	s.	d.
Excavating for clay, getting, filling and wheeling one stage, not exceeding 20 yards	4	0
Chopping and watering for tempering	2	0
Tempering after clay has been soaked	2	0
*Filling, wheeling one stage, tipping to place required, and treading	3	0
	11	0
If unbearing is required to get the clay, add per foot in depth to be removed	1	0

When the clay is tipped into, and can be tempered in the place required, leave out item marked thus*.

Clay puddle, when properly prepared, should be similar to brick earth ready for moulding.

The use of tar concrete (coke dust and tar) mixed together in thin layers, would form an excellent substitute for puddle where clay is scarce. It would also save excavation, as two inches of this stuff would be ample, instead of nine inches of clay.

The use of cement water proofing powders and liquids, where applicable, is preferred. See Painter Waterproof Materials.

BRICKLAYER

MEASUREMENT.

In measuring brickwork all flues are to be measured as solid work below the roof, but above the roof (for labour only) the girt is taken by the thickness of brickwork round flue, and this multiplied by the height, including projections, which are girted. Piers, pilasters, quoins, etc., are also girted for labour only.

The shortest method of reducing cubic feet to the standard thickness of 1½ brick, is to deduct one-ninth, or multiply by 8 and divide by 9.

To reduce 1 brick to 1½ brick wall, deduct one-third from the given area. Why continue useless calculation of rods ?

In measuring height of walls, the wall-plate is included for setting, or allowed for separately.

Footings.—If the projection of the footing is in regular offsets, three or more courses high, the average dimension is sufficient.

Then take the walls above the footings to the ground storey, each thickness storey by storey, to the top.

All additions, as chimney breasts, etc., for each floor to be taken.

If any brickwork is carried up in cement, it can be allowed for and placed under a separate head.

Measure chimney shafts, the width, height, and thickness.

To measure the projections for cornices, courses to chimney shafts, etc., take the several lengths and multiply by their width, and the thickness beyond the face of the brickwork previously taken. Circular work is measured on the curve, in the centre of the wall, for very quick curves and otherwise by external face.

The Deductions.—Deduct all windows, doors, openings, etc., on each floor. It is recommended to take the width of the opening first, and then the height.

If the reveals are square, deduct in one dimension. If recessed, they must be taken in two or more.

Facings are measured by the square yard. Keep moulded bricks separate.

Flat joint and tuck pointing are measured by the square yard.

Number all sash and door frames, bedded and pointed ; if over 28 feet superficial, keep separate in estimate.

Brick walls, if classified together according to their thickness, admit of a more equitable estimate being made than by the common and laborious method of rods now antiquated with the advent of concrete constructions.

As many builders prefer to do away with the **tedious rod method** and measure their brickwork by the simple thousand bricks, a fairly accurate way of arriving at the number of bricks in job, is to measure superficial

area, and reduce the walls to 9-in. work, then allow nine bricks per super foot or take separate wall thicknesses and reckon by table below face measurement of brickwork.

Example : A wall 20ft. long x 10ft. high equals 200 super feet ; 200 x 9 = 1800 bricks required for 2 squares of 100 sq. feet.

FACE MEASUREMENT OF BRICKWORK.

4½ bricks to one super foot of walls half brick thick.
9 bricks to one foot superficial or face of 9 inch thick.
13½ bricks to one foot of brick and a half thick.
10 bricks to one foot superficial of gauged arches.
18 bricks to one foot superficial two bricks thick.
12 bricks in mortar = a cubic foot.

MEMORANDUM.

Good Mixture for Mortar, 1 Bag Lime.

Lime mortar of good quality will result from mixing one bag or 2 cwt. of fresh burnt lime with an ordinary tipcart load of sand, about 32 bushels, or 25 cubic feet, and will be sufficient to lay about 1000 bricks.

For 4½-inch walls it is advisable that an addition of 10 per cent. of cement to mortar mixed as above will produce a stability and firmness in the wall that will more than repay the additional outlay.

A bricklayer's hod working load will hold 14 bricks, 12 on ladder, or ½-bushel of mortar.

Labor.—A good tradesman should lay per day of eight hours—600 to 700 bricks of 9in. work in cement, struck joint ;

700 to 1000 bricks, 14in. work, in mortar, and 500 in O.K. or picked face worked.

Space Taken and Material Required to Make 1000 Bricks.

1000 bricks stacked close measures 55 cubic feet small English.
,, ,, stacked close measures 66 cubic feet. Australian machine-made.
,, ,, can be made from 3 cubic yards of solid clay.
,, ,, require 8 to 10 cwt. of coal fuel—open kiln.
,, ,, require 2 to 3 cwt. of coal in a Hoffman kiln.

Brickwork in Lime Motar.

Bricks—1000	=	£3 15 0
lime 1½ bags at 9/–	=	13 6
sand 1½ loads at 7/–	=	10 6
water per 1000	=	1 0
Labour laying 1000	=	2 10 0
= per 1000		£7 10 0

BRICKWORK IN CEMENT.

Bricks—1000	=	£3	15	0
2 bags cement at 5/–	=		10	0
1½ loads sand at 7/–	=		10	6
water	=		1	0
Labour laying	=	3	0	0
= per 1000		£7	16	6

PER ROD BRICKWORK IN CEMENT.

contains—

3,700 bricks at 75/–	=	£13	17	6
7 bags cement at 5/–	=	1	15	0
4 loans sand at 7/–	=	1	8	0
water	=		3	6
Labour at £3 per 1,000	=	11	2	0
		£28	6	0

9 bricks to one super foot of 9-in. work.
as 9 sq. ft. = 1 sq. yd.
multiply by 9 = 81 bricks to 1 sup. yd.
100 sq. ft. x 9 bricks = 900 bricks
so for every 100 sq. ft. require 900 bricks,
or one tenth less than 1000 bricks.

MATERIALS REQUIRED FOR A CUBIC YARD OF BRICKWORK.

1728 cubic inches equal 1 cubic foot. 46,656 cubic inches equal 1 cubic yard.

384 bricks, 4 courses to the foot.

336 bricks, 4 courses to 13½, or eight layers of 42 bricks each.

1½ bushels of stone lime and 6 of sand, with joints ⅜in. thick.

1 bushel cement or stone lime and 3 of sand, with ¼in. joints.

VARIOUS CONTENTS OF A ROD.

90¾ super yards equals one rod of 4½-inch brickwork.

45⅓ super yards equals one rod of 9-inch work.

30 2/9 super yards equals one rod of 13½″ work.

Bricks.—3672 bricks of 4 courses to 13½ inches, of ordinary brickwork.

Mortar.—3 to 1, 48 bushels of sharp sand, and 16 bushels or eight bags of stone lime.

27 feet cub. of mortar requires 9 bushels of lime and 1 cub. yard sand, or 23 bushels.

6 to 1 Cement Mortar.—1 load sand = 21 cub. feet.

1 cask cement = 3½ cub. feet.

A cubic yard of sand is twenty-three striked bushels.

One cask of cement contains 3½ cubic feet or 4 cubic feet loose.

Water.—200 gals, for mortar and 400 gals. for wet bricks = 600 gals. at 1/6 per 1000 gals.—about 1/– per rod. Cement mortar only requires 162 gallons, or 3 hogsheads per rod.

A one horse dray load = 333 bricks.

A double load = 667 bricks.

1000 machine-made commons, average weight 3 tons 10 cwts.

Terms.—" **Commons** " for ordinary work.

" **Callows** " unbaked bricks. Suitable for interior walls.

" **Clinkers,**" overbaked and distorted bricks, suitable for foundations.

Sand lime bricks are made same size as shale brick, at Bondi.

Coke Breeze Bricks, same size as shale brick, are used chiefly as fixing bricks, built in.

Weight.—**Sandstock** bricks generally weigh 7lbs. each, or not less than 74 cwt. per thousand, say 13½ tons per rod, the mortar weighing about 3 tons at 24 cubic feet per ton. The rod of brickwork may therefore be considered to weigh about 16½ tons of English size bricks, or about 36 cwt. per cubic yard.

Sydney machine-made bricks weigh 8 lbs. to 8½ lbs. each = 18½ tons per rod.

A rod of reduced brickwork will require about 170 hods of mortar.

Cost of a ROD OF BRICKWORK and Lime Mortar.

Bricklayers' wages, 24/– and Labourers' wages, 21/– per day.

Bricks at kiln : 3700 at 65/– ; cartage 10/–, 75/– ...	£13	17	6
4 bags of lime, 9/–, 1½ cwt. each	1	16	0
4 loads of sand at 7/–	1	8	0
Labor, laying 3700 at about 50/– per 1000	9	5	0
Net	£26	6	6

Openings not deducted.

Add scaffolding, cartage and profit.

Cost of a ROD OF BRICKWORK in Cement Mortar, Mixed 4 to 1.

Bricks as above, about 3700 at 75/–	£13	17	6
7 paper bags Cement, at 5/–	1	15	0
4 loads of Sand, at 7/–	1	8	0
Labor, 3700 at 60/– per 1000 and water 3/–	11	5	0
	£28	5	6

ONE ROD OF BRICKWORK Contains—

About 3700 Sydney machine-made bricks.
272 feet super, of 1½ brick, or 13½ inches in thickness.
408 feet super of 1 brick, or 9 inches in thickness.
816 feet to half brick, or 4½ inches.
Or 11⅓ cub. yds., or 306 cub. ft.
Or 235 cub. ft. of bricks and 71 cub. ft. mortar.

Faced with O.K. Bricks.

Add extra cost of bricks. From £3 per 1000 extra or 1300, bricks, 44/– ; labour extra, 16/– = 60/–.

Or (6/– to 12/– per 100) for 1224 face bricks contained in rod of 1½ vent inside, 16/– per vent.

If the brick facing or face bricks are measured separately, half the depth of the reveals are included in the measurement.

HOOP IRON FOR BONDING, &c.

(*Weight per Lineal Foot.*)

Gauge No.	Weight in lbs.	Width in inches.	Gauge No.	Weight in lbs.	Width in inches.
13	0.62 :	2	16 = $\frac{1}{16}$in.	0.31	1½
14	0.47 :	1¾	17	0.21	1⅛
15	0.36 :	1½	18	0.16	1
15	0.34 :	1⅜	19	0.12	⅞

	s.	d.
Hoop Iron, in bundles, of ½ cwt. ... ... per cwt.	47	6

½-cwt. bundle, 1½ x $\frac{1}{16}$, called 16 gauge, contains 180 ft.
½-cwt. bundle, 1¼ x $\frac{1}{16}$, contains 210ft.

LABOR AND SCAFFOLDING.

Wages at 24/– per day, Per Rod, Reduced.

	£		£
Brickwork, garden wall bond, two faces	10	to	12
Brickwork in circular tanks, culverts, cess-pools or wells, ½-brick thick, including trammels and centres, from	12	to	14
1 brick or more in thickness, from	9	to	12
Brickwork in mortar for 4½in. walls	11	to	13
Ditto, do. for 9in. walls	9	to	12
Ditto, for 1½ brick walls	8	to	11
Foundations or for walls, 2 or more bricks thick ...	8	to	10

Extras.

Add if worked fair on both sides, per sup. rod ...	£1	0	0
Cavity walls	1	10	0
If in cement, add one-sixth			
If old bricks with bats are used, add	£1	to 1 5	0
Cleaning and Stacking per 1000 bricks	£1	to 1 10	0

Add for mortar, cement or bricks, as per estimate.
The larger prices include flushing-up all joints.

Labour only, A.G.G. hollow glass bricks in partition, 700 in one day (bricklayer 24/–, labourer, 11/–, 35/– = 5/– per 100.

LABOR AND SCAFFOLDING.
Per Cubic Yard.

Bricklayers' wages, 24/– ; laborers', 21/– per day.

	£	s.	d.
Bridges, abutments, etc., not less than 1½ brick thick	0	14	0
Arches, large culverts, or Skew bridges ...	0	14	0
Ditto, or culverts, 1 brick thick	1	0	0
Ditto, or culverts, ½ brick thick	1	5	0
Ditto, lining to sewers, ½ brick thick ...	1	5	0
Piers, small and lofty, 4 sides plumbed ...	1	16	0
Coppers, ovens, furnaces, cupolas, or ½ brick culverts	0 18 0 to	1	10	0
Factory Chimneys, square, any height below 60ft.	0 16 0	1	0	0
Ditto, circular, any height, to 4ft. flue ...	0 16 0	1	4	0
Ditto, circular, over 6ft. to 12ft. flue ...	0 12 0	0	16	0
Ditto, octagon, any height, or church spires ...	1 0 0	1	10	0
Brickwork in cement, with wet bricks, for curved arches, circular on plan, per cubic yard, from	3 0 0 to	5	0	0

Chimneys more than 60ft. high, add 2% for every extra foot.

If built from inside, deduct 10 per cent.

If in cement, add one-sixth of these items.

Say 3 bricklayers, 24/– = 72/–, 1 laborer, 20/– = 92/– per 1000 bricks.

Laying 9″ x 4″ x 3″ bricks common, 5/– per 100 or 50/– per 1000.

SUNDRIES.

Based on Labour, per hour, 3/–	per ft. run. s.	d.
Cuttings to 9in. rakes or ramps	0	6
Ditto, 14in., do. do.	0	8
Ditto 18in. do. do.	1	0
Chamfering angles	0	4
Cutting birdsmouth and squint	0	6
Raking out and pointing in cement to flashings	0	4

	s.	d.		£	s.	d.
Bedding and pointing sash and door frames ...	2	6	to	0	3	6
Fixing Chimney pots	2	6	to	0	3	6
Setting register stoves, complete				0	15	0
Ditto, colonial ovens, from				1	0	0
Labour setting laundry, 12 gal. copper, with wheel flue to chimney flue, finishing top in cement				2	0	0
Add for materials.						
Cutting out and bonding new work to old, toothing courses in mortar, per super ft. ...				0	1	0
Ditto, in cement mortar				0	1	6

Underpinning Walls.—Cutting away shale or old brickwork to 5ft. high, and rebuilding foundation footings, brick and cement, in lengths not exceeding 5 feet, labour only, per cubic foot, 2/–.

Cutting out brickwork, 1 course 9 inches wide in lime-mortar wall and inserting 2 layers of slates in cement above floor, per foot run, 5/–.

NEW DAMP COURSE INSERTED IN OLD WALLS.

Under floor reckon double according to cement, hardness of wall joints and cramped position, 20/– per foot run.

Cost of cutting 9in. x 6in. ventilating holes through 9in. brick in lime mortar wall, and fixing 9 x 6 T.C. ventilator outside, and plaster vent inside, 16/– per vent.

To make new chimneys soot proof.—Mix ½lb. salt to bucketful of pargetting mortar.

BRICK MATERIALS.

Per 1000 at Kiln.	£	s.	d.
Bricks, common or ordinary bricks, Sydney firsts ...	3	5	0
Clinkers	3	0	0
Open Kiln face red £5 15 0 black	6	5	0
Open Kiln moulded headers £7 10 0 bullnose	6	0	0
Moulded Stretchers £8 15 0 common	7	15	0
Black Moulded Stretchers £9 5 0 common splayeds	7	5	0
Stops, single, 6d. each, double 9d.			
Double bullnose £8 15 0 common	7	15	0
Chamfered or squints £8 15 0 splayed ogee	7	5	0
Face bricks		115/–	
Brickettes ornamental, different sizes		161/–	

VARIOUS CITY STATES.

Prices Compared.

City	Working week.	Basic wage.	Wage of setters.	Common bricks per 1000
Sydney ...	44	70/–	100/–	65/–
Melbourne ...	44	69/–	89/6	62/–
Brisbane ...	44	74/–	76/6	65/–
Adelaide ...	48	63/–	83/–	70/–
Perth	44	70/6	87/6	65/–

In view of the introduction of the 40-hour working week by the Labour Government in New Zealand, it is interesting to note that, with a wage of 96/8 for brick setters, the price of bricks has risen in Auckland to 103/– a thousand.

COLORTEX FACE BRICKS.

in all blended colours. Mat surface or glazed, comprising Red, Brown, Yellow Buff, Purple, Blue

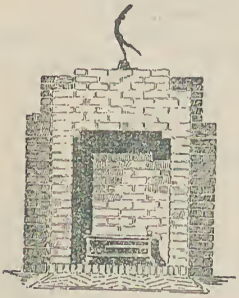
9″ x 4½″ x 3″, 9″ x 4½″ x 2″, 9″ x 4½″ x 1″,

Prices on application. Wunderlich or Advertisement pages 1 & 19.

Brickettes same as above 6½″ x 1¼″ x 3″, in all blended colours.

Terra Cotta Facings, polished 4 inches thick, from £2/5/– plain, per sq. yd., to £4/10/–.

Rusticated bricks, rock-faced and no tuckpointing, £5/15/–.



BRICKETTES.

Ornamental, various colours, £9/–/– per 1000, Metropolitan Area.

Fireplace double price for single piece brick.

Facing cement straight concrete structures, 4½″ half brick courses = 60/– per 1000.

Labour only, curved to template, 90/– per 1000.

FIRE BRICKS

		£	s.	d.
English Fire Bricks, 9 x 4½ x 3in. ...	per 1000 ...	12	10	0
,, Arch Bricks, side and end wedges	,, ...	12	0	0
Colonial Bricks, 9 x 4½ x 3in. at kiln ...	per 1000 ...	£6 to £10		
	According to quantity			
,, Arch Fire Bricks	... ...	7	10	0
ire Clay, Colonial	per cwt.	0	6	6
ven Tiles, 12 x 12 x 2in.	each	0	2	0

Fire Lumps, Bakers' Ovens Sets, Colonial made—45/– set large blocks
1 of 36 x 12 x 6in.
1 of 32 x 12 x 6in. } 2 10 0
3 of 18 x 12 x 6in.
Equals 10ft. at 5/–.

Best English Oven Sets	...	...	...	...	...	3	0	0
Common, at kiln	...	...	...	...	...	3	10	0

For quantities, *see advt. pages* 1 & 19 and R. Fowler.

VENTILATED AIR BRICKS.

For Brickwork.	per doz.	For Woodwork.	per doz.
9 x 6 T.C. sq. hole	8/6	9 x 6 galv. louvres	7/6
„ „ louvre	10/–	9 x 6 cast zinx louvres	43/–
„ „ hooded ¾	27/–	9 x 6 plain steel faces	8/6
9 x 6 plaster vents	6/–	9 x 6 hit or miss—no box	20/–
		do. do.—with Box	33/6

Galvd. Iron Wall Ties, No. 8, 26/–, No. 10, 17/6 per 1000.
Lime per bag, 8/6.
Sydney Sand, 7/– to 9/–. River Sand, 12/–.
Cement, per bag of 94 pounds, 5/–.
Plaster of Paris " Diamond " in casks of 300lbs., 42/– cask.
„ „ „ Victor and Waratah, 1 cwt. bags., 9/– per cwt.

CONTRACT PRICES OBTAINED.

Common Bricks at 60/– per 1000; Face 110/–; Cartage 10/–.

	per rod. £	s.	d.
Brickwork, in mortar, including arches in cement, 3 to 1	29	10	0
Ditto in cement	35	0	0
Brickwork in mortar, hollow walls and ties	31	0	0
Brickwork, in cement	36	0	0
Tuck Pointing, new work, including coloring, per square yard	0	2	6
Ditto, old work, ditto, and raking out, per square yard	0	3	6

Note.—Bricks have advanced in price since obtaining this information.

POINTING.

Labor and " All Materials," per yard super.	s.	d.
Flat joint or white pointing, including raking out and scaffolding	2	6
Ditto, to chimney shaft, do. up to 50ft. high	3	6
Tuck pointing to new work and scaffolding	2	0
Ditto, to old work, including raking out, cleaning, staining and scaffolding	3	6
Cleaning down walls, per 10ft. square with diluted spirits ...	3	0
Country work, per yard, tuck pointing	3	6

BRICKLAYER'S AWARD, 1938.

Fares paid over 4d. per day to jobs, city and suburban work, 2/9 $^{15}/_{22}$; 44 hours per week.

PAVING.

Labor, etc., per yard super.
1924 Award, 2/9 $^{15}/_{22}$.

Bricks at Kiln, 65/– per 1000 ; Cement at paper bag 5/–, 94lb. paper bag.

	Lime or cement. s.	d.	Labor s.	d.
32 **Bricks** flat in sand, laid straight or herring-bone...	0	3	1	6
41 ditto, on edge, in ditto	0	4	2	0
32 ditto, flat in mortar and jointed do.	0	7	2	6
41 ditto, on edge, do.	0	10	3	6
If laid flat in cement, add on mortar	0	4	0	8
Ditto, on the edge	0	5	1	8
8, 9, 10, or 12in. tiles, in cement mortar ...	3	6	3	0

Paving Material, per square yard—
Calculating Bricks at 70/– per 1000.
Add 2/6 on flat ; 3/– on edge to above.
One bag cement, 8 cubic feet of sand, for grouting 6 yards.
Paving for water channels or open drains, add from one-fourth to one-half for extra labor.

MATERIALS REQUIRED TO BUILD BRICKWORK.

In examples of estimating I have varied the prices of materials slightly, as they fluctuate according to the monthly price lists issued.

Ordinary W.B. Cottage Kitchen Chimney of the following dimensions:—
Fireplace 3ft 6in. wide x 18in. deep, with 9in. back and sides ; 5ft. x 10ft. front, 16ft. to top of chimney, with foundation :—

	£	s.	d.
Bricks—1000 at 70/–	3	10	0
Lime—1½ bags at 8/6	0	12	9
Sand—1½ loads at 7/–	0	10	6
Cement—½ bag, 5/– bag	0	2	6
Scaffolding and labor to above	5	10	0
Add for cartage to job 2/6.			
	£10	5	9

For W.B. or " Durabestos " Cottage.

Usual Double Chimney, with 5ft. breasts, 10ft. high, 18ft. to top of double chimney :—

	£	s.	d.
Bricks—1500 at 70/– delivered	5	5	0
Lime—2 bags at 8/6...	0	17	0
Cement—½ bag, 2/6 ; 2 bars, 5/–...	0	7	6
Scaffolding and labor to above	9	7	0
Net	£15	16	6

Kitchen Chimney, 6ft. wide overall at bottom, and bottle stack 14ft. high; brick foundations overall 6ft. 9in. x 3ft. 9in.; fireplace. 4ft. 6in. wide, 4ft. x 27in., 9in. back :—

	£	s.	d.
Bricks—900 at 70/– per 1000	3	3	0
Lime—1¼ bag at 8/6	0	10	6
Sand—1¼ load at 7/–	0	8	9
Scaffolding and labor	6	7	6
Net cost	£10	9	9

Ordinary Brick E.C., 4ft. 6in. x 3ft. 6in. x 8ft. high inside x 4½in., walls :—

	£	s.	d.
Brickwork—750 at £7/10/– per 1000 laid ...	5	12	6
Floor—Concrete, 2 yards at 10/–	1	0	0
Roof—Galvanised iron, 3 of 7ft. sheets at 4/– ...	0	12	0
Rafters—Plates and fixing	1	5	0
1in. T. and G. ledge door, 20/–; lock, 4/–; louvres, 10/–; labor, 20/–	2	14	0
G.1 Pan, 8/–; seat, 10/–; fixing same, 8/6 ...	1	6	6
Painting door and coloring walls	1	0	0
Net cost	£13	10	0
If walls are 9in. thick add	5	0	0

Setting Washing Copper, with chimney 12ft. high :—

	£	s.	d.
Bricks required, 450, 80/– per 1000, lime, ½ bag, 4/–; sand, ½ load, 4/6...	2	4	6
Labor to above about	3	3	0
Net cost	£5	7	6

Setting Washing Copper (see prices if they have fluctuated according to the stock exchange on copper).

With wheel flue in corner of building :—

	£	s.	d.
Bricks, 250, 20/–; lime, 2/6; sand, 4/6, and cement, 2/6	1	9	6
Labor to above about	1	4	0
	£2	13	6
Add 12 gal, copper, 35/–, door and grate, 5/– about	2	0	0
	£4	13	6

Reinforced Brick in Cement Lintels over ordinary 3ft. door or window openings may be built in flat courses, with three layers of the special reinforcements of expanded metal "Exmet," or steel-wire-mesh "Brictor."

In all cases, with or without the reinforcement, a close heading joint must be kept in brickwork over openings, and a rigid support maintained till the cement has thoroughly set and dried.

REINFORCED LINTELS AND BEAMS.

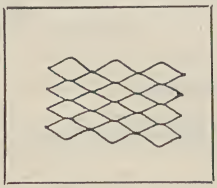
Coke Breeze and Blue Metal Reinforced Lintels, per foot run.

	Breeze	Blue Metal
6½in. x 4½in. thick, 2 courses of brickwork	–/10	1/3
9½in. x 4½in. thick, 3 courses of brickwork ...	1/3	2/–
Over 8ft. long	1/6	2/3
13½in. x 4½in. thick, 4 courses of brickwork	1/9	2/9
Over 10ft. long	2/6	3/–

Lintels faced Smooth, 6d. per lineal foot extra.
Special lintels for partition blocks, 2 courses, 1/–.
3 courses, per foot run, 1/6.

BRICK-WORK REINFORCEMENTS.

" **Exmet** " is an expanded steel production, consisting of a fine integral mesh, 20 to 24 gauge steel, similar to Plasterers' Lathings, in rolls 2½in. wide, dipped in Asphaltum paint.



BRICKWORK REINFORCING.

2½in. wide, 24G.	75ft. rolls	7/6	roll
,, ,,	270 ,,	17/–	,,
4in. ,, ,,	75 ,,	11/6	,,
7in. ,, ,,	75 ,,	18/–	,,

See Agents Adv. p. 5.

" **BRICTOR** " is a wire mesh reinforcement, made in Sydney, and Melbourne, in rolls 75ft. and 150ft. long, galvanized, must be laid in cement mortar.

		Price per Roll. 75ft. Roll.	150ft. Roll.
1½in. wide	24 Gauge	6/–	12/–
2½in. wide		8/6	17/–

(*See Advts.* 2, 22, 36.)

Breeze and cement bricks to build wall in lieu of plugging can be made in long mould by hand mixing, 3, 2, 1.

" **Bricko** " a paint for waterproofing damp walls, per gal. 13/–, ½ gal. 6/9, 4 gal. tins at 12/6 per gal.

Circular Tanks, Wells, Shafts, or Culverts.

Table showing earth to be removed, number of bricks (4 courses to 13½ inches), and contents in gallons; at 60s. per cube yard for brickwork in cement (1 to 2), for each foot in depth.

Clear diam. ft. in.	Half-brick Thick.			One Brick Thick.			Gallons per foot in depth.
	Earth cube ft.	Bricks per ft.	Cost at 60/–	Earth cube ft.	Bricks per ft.	Cost at 60/–	
2.3	7	40	7.4	11	90	16.8	24.6
2.6	9	44	8.0	13	99	18.4	330.6
3.0	12	51	9.6	16	112	21.0	44.0
3.6	14½	59	10.10	20	128	23.8	61.0
4.0	18	65	12.2	24	142	26.4	73.3
4.6	22	73	13.1	28½	157	29.0	99.1
5.0	26	80	15.0	33½	170	31.8	122.3
5.6	31	88	16.4	38½	185	34.8	148.0
6.0	36	95	107.0	44½	200	37.0	176.2
6.6	41½	103	115.0	51	214	39.8	206.8
7.0	48	110	123.0	57	248	39.8	239.8
8.0	61	124	140.0	71	255	47.8	313.2
9.0	75	133	150.0	87	278	51.8	396.5
10.0	91	141	160.0	104	300	56.8	489.5

Semi-circular domes contain the same number of bricks as an equal height of the sides or barrel, *e.g.*, a semi-circular dome of 10ft. diam. and one brick thick contains 340 x 5 = 1700 bricks.

The price given for tanks, &c., one brick thick, would include the excavation in earthwork at Sydney or Melbourne prices.

When calculating bricks by the above table, deduct one-tenth from number of bricks stated for ordinary machine bricks.

Current price per cubic yard to be ascertained, as per page, and the difference allowed for as per table, *e.g.*, if 50s., reduce one-sixth.

Square.—If brickwork was reckoned by the square the measurement and calculation would be greatly simplified.

Labour only.—Doorways and other openings are not deducted, except more than 36 super feet each when half the area is deducted for labour only.

Terms Used.

"Lime or cement and mortar" includes scaffolding, centering moulds, templates, and all materials except bricks.

"All material" includes lime and mortar and bricks, when all openings are deducted in the measurement and arches, &c., allowed for. This is the English and standard method.

Circular Tanks and Shafts.

Bevelled Bricks are sometimes used for small wells and tanks by which the labour of cutting the ends of the bricks is saved, and a

finer joint obtained. If built with half brick rim the inner face of 9 inch bricks will measure as follows, viz. :—

Clear diam.		Clear diam.		Clear diam.	
Feet	Inches.	Feet	Inches.	Feet	Inches.
1½	6	3	7¼	4½	8
2	6½	3½	7½	5	8⅛
2½	7	4	7¾	6	8⅜

Circular Tanks and Shafts.

Table showing earth to be removed, number of bricks (4 courses to 13ins.), and contents in gallons for each foot in depth; also number of bricks in semi-oval domes, with rise equal to one quarter the span.

Clear diam. feet.	One Brick Thick			One and a half bricks thick			Gallons each foot in depth
	Earth cubic feet.	No. of Bricks.		Earth cubic feet.	No. of Bricks.		
		Semi-oval dome.	Each foot in depth.		semi oval dome.	Each foot in depth.	
10	104	900	350	118	1490	540	409
11	123	1070	380	138	1770	590	594
12	144	1280	410	160	2090	640	706
13	164	1470	440	183	2390	690	831
14	184	1670	471	208	2700	740	962
15	214	1900	503	234	3100	709	1106
16	241	2160	535	262	3520	835	1256
17	269	2470	566	292	3980	885	1419
18	299	2780	597	323	4400	930	1589
19	331	3080	628	355	4880	975	1775
20	364	3400	650	389	5400	1025	1963

N.B.—The above domes are intended to be circular on plan and semi-oval in section, with man-hole in the centre. The 10 feet semi-oval dome requires only 900 bricks, while the semi-circular dome, of the same diameter, requires 1800 bricks. This English brickwork table is reckoned 10 bricks to the sup. foot (one brick thick). It will also be found that circular domes contain the same number of bricks as an equal height of the tank they cover provided they are of the same thickness.

Bricks and lime or cement will not properly combine unless the bricks are soaked with water immediately before being used. If this is done the work will never give way in the joints. A similar, but less effective result, may be obtained by watering dry walls before the mortar or cement is set, or partially so by grouting.

Deduct one tenth from above numbers for 3675 machine made bricks to the reduced rod, as the brickwork of Sydney and Melbourne generally averages 9 bricks to the super. foot, one brick thick.

TABLE SHOWING THE NUMBER OF BRICKS REQUIRED FOR WALLS *of all areas at* 4,080 *bricks per reduced rod.*

Area of wall.	Bricks thick and bricks required.				
	½-brick.	1-brick.	1½-brick.	2-bricks.	2½-bricks
1	5	10	15	20	25
2	10	20	30	40	50
3	15	30	45	60	75
4	20	40	60	80	100
5	25	50	75	100	125
6	30	60	90	120	150
7	35	70	105	140	175
8	40	80	120	160	200
9	45	90	135	180	225
10	50	100	150	200	250
20	100	200	300	400	500
30	150	300	450	600	750
40	200	400	600	800	1,000
50	250	500	750	1,000	1,250
60	300	600	900	1,200	1,500
70	350	700	1,050	1,400	1,750
80	400	800	1,200	1,600	2,000
90	450	900	1,350	1,800	2,250
100	500	1,000	1,500	2,000	2,500
200	1,000	2,000	3,000	4,000	5,000
300	1,500	3,000	4,500	6,000	7,500
400	2,000	4,000	6,000	8,000	10,000
500	2,500	5,000	7,500	10,000	12,500
600	3,000	6,000	9,000	12,000	15,000
700	3,500	7,000	10,500	14,000	17,000
800	4,000	8,000	12,000	16,000	20,000
900	4,500	9,000	13,500	18,000	22,500
1,000	5,000	10,000	15,000	20,000	25,000
2,000	10,000	20,000	30,000	40,000	50,000
3,000	15,000	30,000	45,000	60,000	75,000
4,000	20,000	40,000	60,000	80,000	100,000
5,000	25,000	50,000	75,000	100,000	125,000
6,000	30,000	60,000	90,000	120,000	150,000
7,000	35,000	70,000	105,000	140,000	175,000
8,000	40,000	80,000	120,000	160,000	200,000
9,000	45,000	90,000	135,000	180,000	225,000
10,000	50,000	100,000	150,000	200,000	250,000
20,000	100,000	200,000	300,000	400,000	500,000
30,000	150,000	300,000	450,000	600,000	750,000
40,000	200,000	400,000	600,000	800,000	1,000,000
50,000	250,000	500,000	750,000	1,000,000	1,250,000

Deduct one-tenth from above numbers as 3675 machine Australian-made bricks equals the reduced rod.

Table showing the value from One, to Two Hundred and Seventy-two Feet of reduced Brick Work, from £3 to £12 per Rod.

Feet.	At £3 per Rod.			At £4 per Rod.			At £6 per Rod.			At £8 per Rod.			At £10 per Rod.			At £12 per Rod.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
1	0	0	2½	0	0	3½	0	0	5	0	0	7	0	0	9	0	0	10½
2	0	0	5	0	0	7	0	0	10½	0	1	2	0	1	5½	0	1	9
3	0	0	8	0	0	10½	0	1	4	0	1	9	0	2	2	0	2	7½
4	0	0	11	0	1	2	0	1	9	0	2	4	0	2	11	0	3	6
5	0	1	1	0	1	5½	0	2	2	0	2	11	0	3	8	0	4	5
6	0	1	4	0	1	9	0	2	8	0	3	6	0	4	5	0	5	3½
7	0	1	7	0	2	1	0	3	1	0	4	1	0	5	2	0	6	2
8	0	1	9	0	2	4	0	3	6	0	4	8½	0	5	10½	0	7	0½
9	0	2	0	0	2	8	0	3	11½	0	5	3½	0	6	7	0	7	11
10	0	2	3	0	2	11	0	4	5	0	5	10½	0	7	4	0	8	10
15	0	3	4	0	4	5	0	6	7	0	8	10	0	11	0	0	13	3
20	0	4	5	0	5	10½	0	8	10	0	11	9	0	14	8½	0	17	8
25	0	5	6	0	7	4	0	11	0	0	14	8½	0	18	4½	1	2	0½
30	0	6	7	0	8	10	0	13	3	0	17	8	1	2	1	1	6	6
40	0	8	10	0	11	9	0	17	8	1	3	6	1	9	5	1	15	3½
50	0	11	0	0	14	8½	1	2	1	1	9	5	1	16	9	2	4	1
60	0	13	3	0	17	8	1	6	5½	1	15	3½	2	4	1	2	12	11
70	0	15	5	1	0	7	1	10	10½	2	1	2	2	11	5½	3	1	9
80	0	17	8	1	3	6	1	15	3½	2	7	0½	2	18	10	3	10	7
90	0	19	10	1	6	5½	1	19	8½	2	12	11	3	6	2	3	19	5
100	1	2	1	1	9	5	2	4	1	2	18	10	3	13	6	4	8	2
110	1	4	3	1	12	4	2	8	6	3	4	8	4	0	10½	4	17	0½
120	1	6	6	1	15	3½	2	12	11	3	10	7	4	8	3	5	5	10½
130	1	8	8	1	18	3	2	17	4	3	16	5½	4	15	7	5	14	8½
140	1	10	11	2	1	2	3	1	9	4	2	4	5	2	11	6	3	6
150	1	13	1	2	4	1	3	6	2	4	8	3	5	10	3½	6	12	4
160	1	15	4	2	7	0½	3	10	7	4	14	1	5	17	8	7	1	2
170	1	17	6	2	10	0	3	15	0	5	0	0	6	5	0	7	10	0
180	1	19	9	2	12	11	3	19	5	5	5	10½	6	12	4	7	18	10
190	2	1	11	2	15	10½	4	3	10	5	11	9	6	19	8	8	7	8
200	2	4	1	2	18	10	4	8	3	5	17	8	7	7	0½	8	16	5½
210	2	6	4	3	1	9	4	12	8	6	3	6	7	14	5	9	5	3½
220	2	8	6	3	4	8½	4	17	0½	6	9	5	8	1	9	9	14	1
230	2	10	9	3	7	8	5	1	5½	6	15	3½	8	9	1	10	2	11
240	2	12	11	3	10	7	5	5	10½	7	1	2	8	16	5½	10	11	9
250	2	15	2	3	13	6	5	10	3½	7	7	0½	9	3	10	11	0	7
260	2	17	4	3	16	5½	5	14	8½	7	12	11	9	11	2	11	9	5
270	2	19	7	3	19	5	5	19	1½	7	18	10	9	18	6	11	18	3
272	3	0	0	4	0	0	6	0	0	8	0	0	10	0	0	12	0	0

By adding, halving, or doubling, as may be requisite, any quantity or value can be obtained from the above Table.

BRICKWORK OF VARIOUS HEIGHT AND THICKNESS.

M. S. Stanley, A.M.I.E.A., Concrete Engineer.

WEIGHT OF BRICK WALLS IN POUNDS.

Height of Wall in ft.	Thickness of Wall in inches.					
	4½″	9″	13½″	18″	22½″	27″
1	42	84	126	168	210	252
2	84	168	252	336	420	504
3	126	252	378	504	630	756
4	168	336	504	672	840	1008
5	210	420	630	840	1050	1260
6	252	504	756	1008	1260	1512
7	294	588	882	1176	1470	1764
8	336	672	1008	1344	1680	2016
9	378	756	1134	1512	1890	2268
10	420	840	1260	1690	2100	2520
11	462	924	1386	1848	2310	2772
12	504	1008	1512	2016	2520	3024
13	546	1092	1638	2184	2730	3276
14	588	1176	1764	2352	2940	3528
15	630	1260	1890	2520	3150	3780
16	672	1344	2016	2688	3360	4032
17	714	1428	2142	2856	3570	4284
18	756	1512	2268	3024	3780	4536
19	798	1596	2394	3192	3990	4788
20	840	1680	2520	3360	4200	5040
21	882	1764	2646	3528	4410	5292
22	924	1848	2772	3696	4620	5544
23	966	1932	2898	3864	4830	5796
24	1008	2016	3024	4032	5040	6048
25	1050	2100	3150	4200	5250	6300
26	1092	2184	3276	4368	5460	6552
27	1134	2268	3402	4536	5670	6804
28	1176	2352	3528	4704	5880	7056
29	1218	2436	3654	4872	6090	7308
30	1260	2520	3780	5040	6300	7560

MEASURE OF SOLIDITY.

1,728	Cubic	Inches	equal	1 Cubic Foot
27	,,	Feet	,,	1 Cubic Yard
5	,,	Feet	,,	1 Barrel Bulk Shipping
40	,,	Feet	,,	1 Ton Shipping (Merchandise)
42	,,	Feet	,,	1 Ton Shipping (Timber)

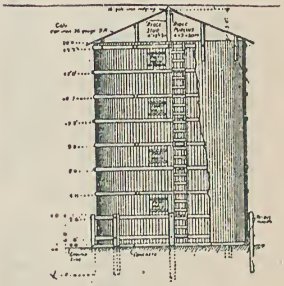
CAPACITIES OF ROUND GRAIN TANKS OR SILOS.

In BUSHELS OF WHEAT.

M S. Stanley, C.E.
Concrete Engineer.

Height of Silo	Diameter of Silos in feet.			
	10 ft.	12 ft.	14 ft.	16 ft.
30	1893	2726	3710	4846
32	2019	2908	3958	5169
34	2145	3089	4205	5492
36	2272	3271	4452	5815
38	2398	3453	4700	6138
40	2524	3634	4947	6461
42	2650	3816	5194	6784
44	2776	3998	5442	7107
46	2903	4180	5689	7431
48	3029	4361	5936	7754
50	3155	4543	6184	8077
52	3281	4725	6431	8400
54	3407	4907	6678	8723
56	3534	5088	6926	9046
58	3660	5270	7173	9369
60	3786	5452	7420	9692
62	3912	5633	7668	10015
64	4038	5815	7915	10338
66	4165	5997	8162	10661
68	4291	6179	8410	10984
70	4417	6360	8657	11307
72	4543	6542	8905	11630
74	4669	6724	9152	11953
76	4796	6906	9399	12277
78	4922	7088	9645	12599
80	5048	7270	9891	12921
82	5174	7452	10137	13243
84	5300	7634	10383	13565
86	5426	7816	10629	13887
88	5552	7998	10875	14209
90	5678	8180	11121	14531
Bushels per foot of height	63	90	123	161
Deduct for Hoppered Bottom	160	281	445	661

Pitch of Hopper Floor, 37½ Degrees.



Silo.
Galvanised Iron lined roof.

Hydrated lime, for Plastering work, retarding the setting of concrete, waterproofing, etc.

Lump limestone, ground fine to 150 mesh. The addition of 10% of hydrated lime to concrete checks air cracks in drying. Obtained in 1 cwt. bags. Price £4 10s. to £6 15s. per ton.

CAPACITIES OF ROUND GRAIN TANKS OR SILOS.

IN BUSHELS OF WHEAT.

M. S. Stanley, C.E., Concrete Engineer.

Height of Silo	Diameter of Silos in feet.			
	16 feet.	20 feet.	22 feet.	24 feet.
36	7360			
38	7769			
40	8178	10096		
42	8586	10600	12827	
44	8995	11105	13438	15962
46	9404	11610	14048	16719
48	9813	12115	14659	17446
50	10222	12620	15270	18172
52	10631	13125	15881	18899
54	11040	13629	76492	19626
56	11449	14134	17102	20353
58	11858	14139	17713	21080
60	12266	15144	18324	21807
62	12675	15649	18935	22534
64	13084	16153	19546	23261
66	13493	16658	20156	23988
68	13902	17163	20767	24715
70	14311	17668	21378	25441
72	14720	18172	21989	26168
75	15129	18677	22599	26895
76	15537	19182	23210	27622
78	15945	19686	23820	28348
80	16353	20190	24430	29034
82	16761	20694	25040	29800
84	17169	21198	25650	30526
86	17577	21702	26260	31252
88	17985	22206	26870	31978
90	18393	22710	27480	32704
Bushel per foot of height	204	252	305	363
Deduct for Hoppered Bottom	904	1284	1723	2322

Pitch of Hoppered Floor, 37½ Degrees.

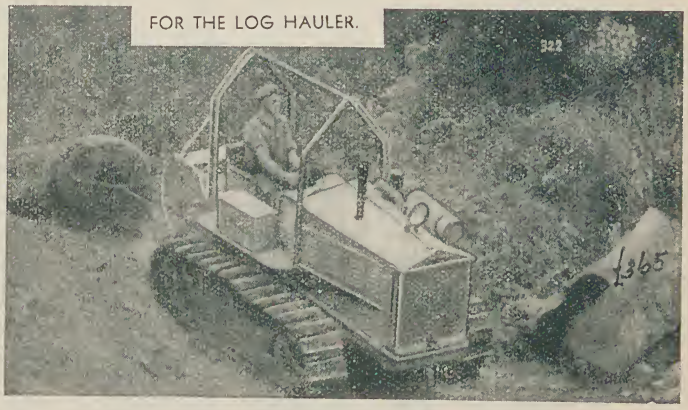
"Medusa" White Portland Cement, mixed with its water proofing powder, -/3½ per lb. Price per lb. plain, -/3 per lb. or 60/- to 70/- per 3 cwt. cask. *See Plastering Section.*

Ferrocrete Cement. A rapid hardening cement said to be 7 times quicker in hardening than ordinary cement concrete, viz., in the proportion of 4 to 28 days of cement and the strength of 6:3:1 mixture = to 4:2:1 Portland Cement. Further particulars from Dickson Primer & Co. Pty Ltd., 73 Day Street, Sydney.

BUSH WORK

Transport of logs through established timber country (*where the rich loamy ground is soft and boggy*) to the open, or depot, is now done by a light railway or traction engines of motor powers, at a cost from –/6 per mile per ton in the log for haulage, according to grades and quantity. *See* Cost of Traction Engines Section.

Labor.—Felling Trees, cutting off and piling branches for burning on clear country per acre.



. *Example.*—Average 12 inches diameter at cut say "green" grey gum, or stringy bark, *straight easy grain.*

One tree, one man per 1½ hour each, wages = 2/6 per hour.

say 20 feet apart = 110 trees to the acre, about £21 per acre net.

40 feet apart = 27 to the acre, ditto, 3/9 each = about £5/10/– per acre.

Uprooting and burning off £1 per tree = £27 per acre.

Add for scrub and undergrowth.

18 inch diameter trees, reckon double or 7/6 each.

2 feet diameter trees, reckon three times, or 11/3.

One acre of land, square block, contains 150 feet x 290 feet, or 100 feet x 430 feet, or 200 feet x 218 feet. *See* Table.

NUMBER OF TREES TO THE ACRE.

4 feet apart		2720	10 feet apart		430	20 feet apart		110
5	,,	1749	12	,,	325	22	,,	70
6	,,	1200	15	,,	200	30	,,	44
8	,,	689	18	,,	135	40	,,	26

Bush Hardwood Timber.—In choosing trees for sawn timber posts, slabs, &c., avoid those with dead branches, or hollow pipes,

which are often an indication of decay or hollow trunk, when the trees otherwise appear sound.

In **Splitting** H.W. or ironbark, the slabs, posts, &c., are split parallel with the rings, and generally thin out towards the top, but in stringy bark and mess-wood, swamp mahogany, the slabs are generally split in radiating lines from the centre outwards, and in this manner have been split 2ft. wide by 5 ft. long.

To Test Soundness of Timber.—Place the ear close to one end of the timber while attendant strikes the other end with a hammer. If the sound is ringing and clear, the log is good, but if dull there is some flaw or unsound spot.

TO DESTROY OR CONSUME TREE STUMPS.

Bore a hole with a 2in. Auger into the stump from the top. Pour a pint of mixture of nitric acid and sulphuric acid, equal parts, and close the hole with a waxed plug. A stump, roots and all, thus treated will be rotten in 30 days.

Another method.—At the end of summer, into a 1in. bored hole, put 2-oz. of saltpetre, fill with 18 in. of water and plug tight. In three months fill the hole with kerosene. When lighted the stump and roots will smoulder away.

MEASUREMENT OF AN ACRE OF LAND.

IN SQUARE ANGLE BLOCKS.

Width	Length	Width	Length	Width	Length	Width	Length
Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.
20	2,178	120	363	210	207	320	136
30	1,459	130	336	220	198	340	128
40	1,085	140	312	230	189	360	121
50	875	150	290	240	181	380	114
60	725	160	272	250	174	400	109
70	622	170	250	260	167	450	96
80	545	180	242	270	161	500	87
90	484	190	224	280	155	550	79
100	436	200	218	290	150	600	73

THE AUSTRALIAN "NEW RECORD" BUSH CROSS CUT SAW.

A One Man Portable Draw Saw, made strong for rough bush conditions in felling and cutting up trees for splitting sleepers, fencing posts and rails, etc.

Equipped with a belt driven 2 h.p. four cycle hopper-cooled oil engine with governor and magneto ignition.

1 gallon of fuel for 8 hours' work.

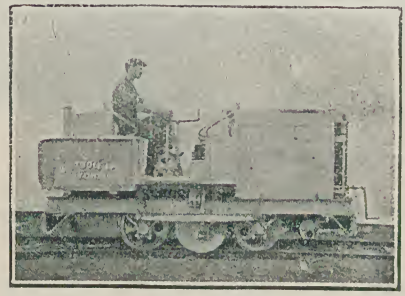
This plant will cut down any tree up to 7 feet diameter, from ground level to 4 feet above, and cross cut it up to lengths without digging.

Shifting of machine for fresh cut, 3 minutes. The blades are adjustable from horizontal to upright.

Plant complete on 3 feet steel wheels with 4 inch tyres, for easy transport. Price complete, approx. £85.

Extra tree-felling attachment, £17.

Saw Blades, 5, 6, to 7 feet long, at 12/6 per foot.



Benzine or kerosene oil driven motor for light railway. Hauling capacity 20 tons.

18 inches gauge and upwards. Approx. price, £1000.

Weight 3½ tons hauls 20 tons over grade 1 in 8. Fuel, 1½ gals. per hour, average 8 miles run, –/5 per ton for 8 miles. Wages and overhead cost.

1 pint per horse power per hour, full speed 10 miles per hour.

TIMBER RAILWAY BRIDGES AND THE LIFE OF TIMBER.

By W. J. Doak.

Mr. S. R. McMeekin (*Associate Member, Brisbane Division*).—Construction and maintenance of timber bridges and similar structures.

Name	Botanic specie	Average life. yr.
Ironbark (Narrowleaf)	*Eucalyptus creba*	20–25
Gidgee	*Acacia homophylla*	20–23
Cypress pine	*Callistris robusta*	18–20
Bloodwood	*Eucalyptus corymbosa*	18–20
Grey gum	,, *punctata*	18–20
Turpentine	*Eyncarpia laurifolia*	15
Box	*Eucalyptus polyanthema*	15
Tallow-wood	,, *microcorys*	15
Red gum	,, *rostrata*	15
Red mahogany	,, *resinifera*	15
Stringybark	,, *capitillata*	10–15
Blackbutt	,, *pilularis*	10–12
Woolly butt	,, *pulverulenta*	10–12
Peppermint	,, *amygdalina*	10–12
Spotted gum	,, *maculata*	8–10
White gum	,, *haemastoma*	8
Messmate	,, *obliqua*	6–7

The table was presented by Mr. J. M. Crawford, B.E., M.I.E.Aust., Chief Engineer, P.M.G.'s Department, a number of years ago.

PRESERVING HARD WOOD TIMBERS.

By charring and creosoting poles before erection, or after by the use of the oxy-acetylene gas flame to sterilise all insect pests and burn up dry rot. To be followed while warm by an application of creosote, which proves effective for 5 years without further treatment. The Mosman Municipal Council near Sydney, (where white ants abound) have found this method of preservation effective.

See other wood preserving methods in painting section.

CLEARING ROADS OR DRAINS.

(Through Ti-Tree Scrubs.)

Scrub-Cutting Roller, drawn across fallen scrub. Worked with side draught. 10 ft. roller, with knives, cuts about 8 acres per day. according to thickness of scrub and size of block. Saves about 30/- per acre. Scrub is cut twice and burns up clean ready for ploughing. Ti-tree sticks up to 4 inches in diameter can be smashed down and cut. Rollers made in sizes to suit.

RAILWAY SLEEPERS.

Railway Track Sleepers. The best sleepers are those hewn from—

Ironbark (*Eucalyptus paniculata, E. crebra* or *E. siderophloia*).
Grey Gum (*E. propinqua* or *E. punctata*).
Red Gum (*E. rostrata or E. tereticornis*).
Grey Box (*E. hemiphloia*).
Tallowwood (*E. microcorys*).
White Mahogany (*E. Acmenioides*).
White Stringybark (*E. eugenioides*).
Yellow Stringybark (*E. muelleriana*).
Woollybutt (*E. longifolia*).
Blackbutt (*E. pilularis*).

The trees should be barked and allowed to die before they are felled, by which means they become partly seasoned. The season for falling Australian timber is from March to September when the sap falls, and then should be split or sawn and stacked in the shade in such a manner to afford ventilation; but with every precaution the ends will open more or less. Sleepers should be stacked with the heart down. The opening of ends may be partly stayed by bolting them or painting ends with whitewash, clay, etc. It would be worse than useless to tar unseasoned timber which would only hasten its decay by preventing the sap evaporating. These remarks apply to all kinds of Australian timber.

SLEEPER GETTERS.

Prices in N.S.W. Association.

Ironbark, 9 feet long, regulation size, 10/6 each; 8 feet long, 6/– each; Hardwood, 9 feet long, regulation size, 9/6 each; 8 feet long, 5/6 each.

Additional Cost—Transport to railway 2 miles away.	s.	d.
Loading, cartage, and unloading, for first mile per sleeper ...	1	0
Boring sleeper, 9 inches wide at both ends	0	8
Riveting sleeper, with ½in. iron rivets	0	6
Removing from heap and re-stacking	0	8
	2	10
Add price of 8ft. sleeper on the whole net cost, Box or Gum	5	6
Each ...	8	4
Adzing sleepers for permanent way, per 100	£1	17	0

The above sleepers average about 14 to the ton.

LABOR ONLY.

Split Slabs, Posts, and Rails.

Basis Labor at 2/3 per hour.	Per 100 count. £	s.	d.
Felling, splitting ironbark slabs 5½ft. x 11½in. x 1½in. ...	2	10	0
Ditto, stringy bark slabs, ditto	2	0	0

Getting Posts and Rails.	£	s.	d.
Stringy bark or gum, 7ft. x 9in. x 4in., and rails 9ft. x 6in. x 3in.	2	0	0
Felling, sawing, and splitting hardwood posts and rails (as per last item), for 3-rail fencing, at per rod	0	4	0
Fencing, per rod, labor only, 7/– to 9/–.			
Cartage of 25 posts and 75 rails (scantling as above, weighing 3 tons) for first mile, including loading and unloading, by team	0	8	0
Ditto, for each additional mile	0	3	0
H.W. split posts, 8 ft. long, at mill, City, price each ...	0	3	0
Labour, Mortising posts, adzing rails, sinking holes, and putting up 3-rail fence, complete, per rod, 16ft. 6in.	7	0	
Nailing 5ft. (*narrow space* ⅛) paling on ditto	1	6	
Ditto, wide (*close paling*), 6 nails each, on ditto	2	0	
Labour	10	6	

Example—Split Paling Fence.

5ft. high, split posts and 2 rails.
Supplied from Timber Merchants, Sydney.

2 Split Posts, 7ft., 3/6 each...	7	0	
50 Palings at 30/– per 100	15	0	
2 rails, 16ft. each, = 32ft. at 2d. foot	5	4	
33ft. of Hoop Iron, 2/2, nails, 200 1½in., = 1/6	3	8	
	31	0	
Labour per rod	8	6	
	39	6	

ROUGH TIMBER BRIDGES.

Labor in bush.

Bridge Carpenters' Award, 1932, 2/6 city, 2/11 country, per hour.

Hardwood.	s.	d.
Felling, trimming, and barking gum or box, for piles, bearers, struts, &c., from 15 to 18 inches diameter, and from 20 to 40 feet long, per lin. foot	1	8
Rough adzing and squaring ditto, ditto	1	6
Pile-driving in clay, sand, loose gravel, &c., ditto	3	6
Hoisting, framing, fixing bolting, &c., ditto, per lineal foot ...	3	0
	9	8
Sawn planking, railings, guard rails, &c., fixed and bolted, complete ... ... per cub. foot	5	7
Wrought hand-rails, &c., framed and fixed, complete, per cub. ft.	7	6
Add bolts, straps, &c., per lb., from ... ... 6d. to	0	8

Example—Planking 3in. thick, per square, viz., 10 feet x 10 feet.	per 100 s. ft.
14 planks of 10ft x 9in. x 3in.=315 sq. ft. at 35/-=per 100	5 10 0
Labor, laying, per square	2 2 6
6-7in. Spikes to each Plank = 84 Count = 32lbs. at 3d. pound	8 0
Waste and incidentals 10%	15 6
	£8 16 0
As 4 thicknesses of planking would be one foot thick—100 cubic feet would cost	£35 4 0
Equivalent to 7/- per cubic foot.	

H.W. WHARFS, JETTIES, BRIDGES, PILING, GIRDERS AND PLANKING.

First-class Construction, 2/6 per hour.	s. d.
Hardwood round piles (vertical), from 20 to 40 feet long, driven complete, per lin. foot	6 0
Ditto, raking ditto, or vertical sheet piling, per lin. foot ...	7 6
If in shallow water, or if more than 40ft. long, add labor ...	2 6
Labour in pile driving, including staging, &c., per lineal foot, from ... ... 2/6 to	4 0
Hardwood, sawn, bolted and fixed in walings, braces, collars, struts, straining pieces, corbels, girders or joists, per cub. foot	7 6
Hardwood, wrought, framed, and chamfered in stanchions, sills, diagonal braces, hand-rails, &c.	10 0
Hardwood, rough, wrought and splayed, in guards, fenders, &c., per cubic foot	9 0
Hardwood 4in. planking, in roadway, &c., laid and spiked, 3/9 ; 3in. ditto, per cubic foot	6 0
Ditto, 2in., ditto in footways, &c., ditto	7 0

The above items include the fixing only of all ironwork, in piles, &c. ; also hardwood within 2 miles.

Turpentine Piles from 20 to 50 feet long, and 12 to 18in. diameter per lineal foot, in Darling Harbour, Sydney, from 2/6 to 4/6.

Laminated Bridge of 70ft. span and 16ft. wide, 4 arched ribs each, with four 10 x 4 bearers on raking piles, etc., for springing, cost about £12 per lineal foot, and large strutted bridges about £20 per lineal foot complete.

RAILWAY BUFFER FRAMES.

For " dead ends " of tracks.	s. d.
Hardwood curbing, uprights, heads, sills, struts, sleepers, &c., framed, housed and bolted, labor only, at per cub. ft. ...	6 0

Iron work to be charged by the pound.

RAILWAY GATES N.S.W.

	£ s. d.
8ft. x 12in. dia. blockwood round capped posts	2 10 0
10ft. gates, including hardwood struts, ironwork, painting and hanging complete, about	60 0 0
12ft. gates, ditto, ditto, ditto	70 0 0

BUILDERS' CONTRACT PRICES, 1938.

FOR EXTENSIVE FLATS (METROPOLITAN AREA)

CONCRETE.

	c. yd.
Raft basis to **Columns** concrete to 6ft. depth...	40/–
Reinforced concrete bases (slabs)	45/–
6″ **Concrete Floors** 9 storeys, boxing and labour ...	46/–
3″ Graded slabs 9′ 3″ between floors	11/–
Drainer 9in. laying & filling	8/–
Tunnelling **excavator** 9′ 6″ x 40′ = 400	15/–
Laying 9in. G.E. Pipes, cost...	23/–
Drainer 4″ GE pipes in 2 feet trench	2/–
6″ ,, ,, per foot	2/6
Cast iron 4″ x 4″ drain pipe ... ... per ft.	5/–
	s. yd.
Painting Face concrete outer face floor, R.I.W. paint ...	–/9
Special boxing in stairs, per 100 s. ft.	30/–
	per 100 s. ft.
Boxing to slab floors	46/–
,, Cross beams & lintels	48/–
,, to concrete in casing pipes	50/–

BRICKWORK.

Reduced brickwork in Mortar under pinning walls	33/–
Brickwork in cement mortar brickwork 3in. on edge Partition Walls	30/–
Extra **Facing** Brickwork 4½″ wide per super yard, extra ...	5/–
Extra Moulded Brick one course, ... lin. ft.	1/6
,, Setting 3″ wide end Verticle bonds per lin. ft.	2/–
,, Common brick **Facing** in 3″ x 1″ cement From lime added flush joints, Raked out 3/8 joint shaped cleaned down with acid	3/6
Extra 3″ wide **Glazed brick** horizontal, all fixed in position lin. ft.	3/–
Terra Cotta blocks as decorative—	
6′ x 9″ x 4½″ Cast imitation stone ... ... each	11/–

DAMPCOURSE.

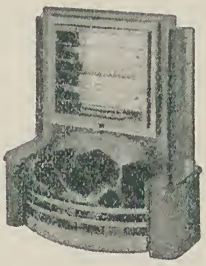
	sup. ft.
2lb. lead & bitu. dampcourse walls & parapets ...	1/9
1lb. ditto. for window & flashing	–/9
2″ Coke breeze concrete blocks ... ... s. yd.	6/–
Plaster core & Pargeting vent flues ... per s. yd.	1/–
T.C. Airbricks 9 x 6 fixed ... ... each	2/–
Brickette Fireplaces 5′ x 4′ open back, labour s. ft.	20/–
Brickettes to Hearth 5′ x 9″ ... ... each	25/–
Brick reinforcement rolls 75ft. long	10/–

BUILDERS' CONTRACT PRICES, 1938.

FOR EXTENSIVE FLATS (METROPOLITAN AREA).

(continued.)

	per cwt.
Archbars 2 x ½ W1—painted before fixing	23/–
Firechamber 486 bricks ½ common bricks, material & labour only	£14
Firebrick flue 32 sup. yards, set in fire clay per s. yard	10/–



FLOORS.

	per sq.
HW Floor joists 2 x 1½, 18″ centers projecting base as key bed set in cement	46/–
Cypress Pine 4′ x 1″ **T & G laid**	36/–
Punched rough & sanded off ... ... per s. yd.	8/–
3 x 1 **Tallowwood** T & G secret nailed per 100 s. ft.	54/–
	s. yd.
Slacked lime ¼ thick under floors on concrete slabs ...	2/3
	per 100 s. ft.
Oregon Beams 16″ x 10″, 14″ x 7″, 12″ x 4″ beams	£2 10 0
Oregon Ceiling joists 4″ x 3″, 4″ x 2½″, & gutter bands, **Rafters** 5″ x 3″, hips 7″ x 3″, 3″ x 1″ battens ...	£2 5 0
Oregon to Box Gutters & awnings, 565 s. ft.	£36 16 0
Rough Oregon Sarking per square	20/–
Malthoid Bitumen Roofing per s. yard	6/–
1¼ W1 bolts & nuts & fixing same, ... per cwt.	85/–
Wunderlich Metal Ceilings ... ... s. yd	7/–
Maple Stairs 21 treads 10″ x 1¼″ per tread	30/–
Flooring 4 x 1 T & G **maple** on landings, per square	£5 12 0
Doors, Maple 6′ & 7′ x 1¾″ and fanlight 3ft. with frame 5′ x 3′ entrance, per opening...	£14
Doors External 9′ x 3′ opening **Maple Door** 7′ x 2′ 10″ x 1¾″ with transome	£6
Doors, Internal Maple 8 x 3 opening, 6′ 8″ x 2′ 8″ x 1¾″ in 4″ x 3″ frame	£5
Doors, Internal Maple 7′ x 3′ opening in jamb linings, door 6′ 8″ x 2′ 6″ x 1¾″	£3 5 0

BUILDERS' CONTRACT PRICES, 1938.

FOR EXTENSIVE FLATS (METROPOLITAN AREA).

FLOORS—*continued.*

Door Sheeted Oregon framed 6′ 8″ x 2′ 8″ x 1¾″ with 5″ x 2″ sill	£3
Door in 4″ x 3″ oregon frame 6′ 8″ x 3′ x 1¾″ ...	£3 10 each
Internal Doors Oregon Pairs 6′ x 7′ opening	£11
,, **Maple & Walnut,** opening	£14
Doors 7′ x 6′ in pairs glass top, in 6″, 2″ frame walnut ...	£13 10 0
Internal Doors Walnut Veneered, 6′ 8″ x 2′ 8″ x 1¾″	56/–
Jamb Linings Walnut rebated	85/–
Internal Doors Walnut, 6′ 8″ x 2′ 2″	56/–
Jamb linings Maple rebated 4½″ x ½″	10/–
Windows in Box frames 1¾″ top hung, 5′ x 3′ opening ...	90/–
Architraves 3′ x 1″ Maple ... ... per lin. ft.	–/4
Curved Counter 8′ x 23″ wide x 3′ high with framing 2″ x 2″ and two shelves **Walnut veneer** front	£35
Fibrous Plaster Sheeting, Circular ... ... sup. yd.	5/–
Chromium letters 6′ x 3″ high per letter... ... each	10/–
	lin. ft.
Shelving Maple 15″ on cleats	1/7
,, **Northern Pine** ,, ...	1/3
Set **Kitchen Cupboards** (painted) with doors & shelves 10′ x 3′ x 2′ 6″ deep	£9
Shaving Cabinets (painted) ... ... each	27/–
Street Awning & return end ... ... per ft. run	£2 0 0
135 ft. long, 12 feet wide	£270 per ft.
Metal Handrail & balustrade Stairs fixed	£1
W1 Ballustrade to stairs	17/6
Steel Windows ... ... super ft.	5/–
,, curved	7/6
Corrugated Sheets Fibro cement ... ... per square	£2 10

PLUMBER.

24G gal. cor. **iron roof awning** screws & washers per sq.	45/–
Box gutters 24 gauge rivetted & soldered ... per s. ft.	–/9
Labour sumps to RW Heads ... ... each	10/–
Eaves gal. iron gutters 5″ ... ... per ft. run	1/–
Down pipes 4″ x 3″ square 24 guage, including bends & junctions... ... ... per ft.	1/2
Cl Down pipes 4″ x 3″ ... ... per lin. ft.	4/–
3″ dia. down pipes ... ... per ft. run	1/–
4lb. Flashing ... ... per cwt.	56/–
Skylights, fixed ... ... each	£2
,, gal. cor. iron wire ribbed.	
W.C. Sanitary sets, low down ... ... each	£6
W.C. Seats ... ... each 30/– to	£2

BUILDERS' CONTRACT PRICES, 1938.

FOR EXTENSIVE FLATS (METROPOLITAN AREA).

PLUMBERS—*continued.*

Sinks P.C. £1/6/– fixing labour 7/6	£1 13 6
1st Class P.C. £2/3/6	fixed £2 10 0
Basins P.C. 30/– each, labovr fixing 10/–... ...	£2 0 0
Baths P.C. £7, add fixing labour 25/–	£8 5 0
Tubs P.C. £1/10/–, labour 10/– each	£2 0 0
Terrazzo Drain P.C. £1/15/–, fix 5/– each ...	£2 0 0
Brass floor gulleys 4″ grating with brass risers 2″ ...	each 45/–
1½″ Copper Nickel plated traps with inspection	15/–
Brass traps with inspection eye	12/–
2″ brass traps ditto.	15/–

CAST IRON SOIL AND WATER PIPES.

4″ C1 Soil pipes lead joints & fixed to wall	40/–
Extra for 4″ x 4″ C.1. junction with inspection eye ...	16/–
3″ C.1 waste & vent pipes	lin. ft. 3/6
Extra for bends 4″ junction inspection pipes and junction dia. 3″ x 2½″ and 3″ x 2″	each 15/–

Cast Iron Galvanised.

3″ C.1. Galvanised Waste & Vent pipes including bends	3/6
2½″ C.1 galvanised	2/–
2″ dia.	1/9
1½″ straight	per ft. 2/6
1½″ nickel plated pipes	lin. ft. 3/6
2″ dia. C.1	lin. ft. 5/–

Gal. iron down and vent pipes fixed.

Brass syphone traps	20/–

24 gauge gal. iron vent and down pipes.

Gal. iron 4″ vent pipes	1/–
3″ ,, ,, ...	–/11
2″ ,, ,, ...	–/7
Gal. 24 gauge 15″ x 6″ Ventilating tube rivetted and solder joints	per ft. run 2/9
15″ x 6″ Bronze Wire panel x ⅛″ mesh	each 3/6
Copper Waterpipe 2in. bore laying complete ...	per ft. run 4/–
1½″ bore copper water pipe	3/6
1¼″ ,, ...	3/3
1″ ,, ...	3/–
¾″ ,, ...	2/6
fixed and concealed in Wall Chases.	

PIPE FITTINGS.

¾″ **Chromium** Plated & fittings	per lin. ft 3/6
¾″ **Copper** breeching pieces to showers	each 20/–
¾″ **Copper Shower** roses	each 7/–
Hose Taps " Easy Clean "	7/–

Bib Taps Basin—Pedestal.

Pillar—Marked COLD	7/–
¾in. stop cock brass	6/6

BUILDERS' CONTRACT PRICES, 1938.

FOR EXTENSIVE FLATS (METROPOLITAN AREA).

PIPE FITTINGS—*continued.*

1in. Stop Cock for service	each	20/–
1½in. „ „ „		30/–
2in. „ „ „		75/–

1000 gal. capacity cor. Copper.

Tank with inlet & outlet on roof	each	£12 10
Gas Copper P.C. £2/10/– fixing 10/–		£3
Fibro cement flues bends &c.		20/–
		s. yd.
Cement-Pavior Green Coloured slab ½in. thick		3/–
½" **Rendering in cement** flat roof	s. ft.	2/–
Painter—External Work		s. yd.
3 coats to woodwork windows		2/–
2 coats Corrosive paint		–/10
3 coats Varnish to woodwork		1/9
Kalsomine Palm brand and cement-sealed		1/6
Laying **Bitumous felt** stuck down with bitumen 1 layer 3 ply malthoid	s. yd.	7/–
Splayed fillet 3 x 3 plugged to walls ...	per ft. run	–/15
	per s. yd.	
Terrazzo Coloured green laid floors		23/–
„ to small entrance strips		25/–
Terrazzo thresholds polished 5′ x 14″ x 1½″	each	20/–
	foot	
Terrazzo 3′ 7″ x 11″ x 1½″ thresholds		3/–
„ 3′ 9″ x 7″ x 1″		2/–
	lin. ft.	
⅞″ skirting 17″ x ⅞″		4/–
„ 10″ x outer stair strip		8/–
Terrazzo ¾″ skirting to 10″ wall strip		5/–

PLASTERER.

		s. yd.
Cement Render Walls including Non-Porite p.c. –/9d. ...		3/6
6 x 3 **Black glazed** tiles to front bedded & joined cement		50/–
Black Carrara Glass facing to brick piers & jointing s. ft.		10/–
Fancy Wall Tiles 6″ x 6″ bath room ...	sup. yd.	26/–
Kitchenette Walls.		s. yd.
½″ thick cement render & trowelled interior walls ...		2/–
4″ skirting in cement 1d. per inch = ...	lin. ft.	–/4
¾″ Waterproof exterior cement render "Non-Porite"	per s. yd.	2/6
Fibro Plaster Ceilings and battens	per s. yd.	5/–
Fibro Plaster Cornice on plugs at angle ...	... s. yd.	2/–
Polished Plate Glass Window	per s. ft.	5/–
Wax Polish tallowwood floors		1/6

CARPENTER

MEASUREMENT.

Timber is generally measured by the 100 feet super.

The superior kinds, such as cedar, mahogany, rosewood, Tasmanian blackwood, veneers, and joinery, &c., by the super foot.

The labour is by the 100 feet square of piecework, such as studs, battens, shingle, T. and G. and other partitions, joisting and flooring, framing, roofing, ceilng and weatherboards.

It will be a saving of time when estimating to form cost price per square (locally), including allowance for waste on lengths.

Round timbers, for **woolsheds, stockyards,** corner posts, telegraph poles, by the piece.

Bridge and small wharf piles are by the pole or single piece.

Larger piles, over a foot in diameter, struts and beams, by cub. foot.

Ceiling, slate, and wall battenings, by the 100 square feet, viz., 10ft. x 10ft.

RULES FOR MEASUREMENT.

The Surface work of joinery, per super foot is accentuated by every angle or determination, according to frequency.

Circular work of every description in Joinery to be charged as follows, viz. :—

Flat Sweep, not more than ½-inch rise per foot, or curves of circles not less than 3 feet diameter, once and a half the price of straight work.

Quick Sweep or Eliptical, or more than ½-inch rise per 12-inch chord, twice the price of similar straight work ; the same, according to sharpness of the curves.

The above proportions apply to the shape on the plan or to the elevation only.

If they occur on both plan and elevation as circular, they must be reckoned twice or three times the price of circular on plan only, *e.g.*, if flat sweep on both plan and elevation, the proportion would be $1\frac{1}{2} \times 2 = 3$ times the price of straight work.

If quick sweep on both plan and elevation, the proportion would be $2 \times 3 = 6$ times the price of similar straight work.

If flat sweep on plan and quick in elevation, $4\frac{1}{2}$ times.

If quick sweep on plan, and flat in elevation, 4 times the price of similar straight work.

MEASUREMENT—CARPENTER & JOINER.

Circular sashes, frames, shutters, &c., to be measured square, and circular heads to doors, &c., to be measured square above the springing, which gives an addition of $21\frac{1}{2}$ per cent. on the net measurement, exclusive of the extra charge determined by the previous Rules.

Circular, plain glued in thickness, for all degrees of curvature take twice the price of similar straight solid work, and if circular from 3 to 4 times, according to sharpness of curves.

Cornices.—In measuring cornices and mouldings, the foot run is to be taken, according to width of traversed surface, &c., as the case may be.

EXPERT ADVICE ON TIMBER AND ITS PROPER USE.

To ensure that those who use wood can obtain free expert advice on its proper use, the Forestry Commission of N.S.W. has established a Division of Wood Technology which provides free information on all phases of wood utilisation including :—

Suitable timbers for any and every purpose.
Strength, weight and shrinkage of timber.
Sources of supply and prices of timber.
Seasoning of timber.
Correct moisture content for each and every use.
Whether wood is properly seasoned for use.
Architectural and Engineering problems concerning wood.
Identification of timbers.
Methods of wood finishing.
Prevention of Decay.
Prevention and eradication of borers and white ants.
N.S.W. Timbers for Building Purposes, see end of book.

THE COST OF LABOUR TO JOINERY—Comparative.

Taking **clear pine** as a standard—

"**Joinery**" **Oregon,** fine grain, picked, 10 per cent. more than clear pine.

Oregon (stock) and cyprus pine, 15 per cent. more than clear pine.

Cedar, Huon Pine, &c., is about 25 per cent. more.

Tasmanian Blackwood, Queensland Maple, is 35 per cent. more.

Oak, American Walnut, Teak, Japanese Oak, 35 to 50 per cent.

Jarrah and Aus. Hardwoods, from 50 to 75 per cent. more.

HARDWOOD GIRDERS.

Hardwood Girders—Mill Prices per 100 ft. super.

	s.	d.
Heavy Scantling, 4in. to 6in. x 12ft. to 30ft. long	40	6
Tallowwood, ditto, 28/– ; Spotted gum, ditto	42	6
H.W. Deck Planking, 2½in., 3in., 4in. thick, to 12in. wide ...	36	0
Oregon Girders, up to 30ft. long.		
15in. x 15in. and over, up to 18in. x 18in., per 100 sq. ft. ...	42	0

See Road Section.

The items of costing are taken from the **Monthly Timber Merchants Price Lists** and the labour at 2/6 per hour, generally as a basis. Any difference can be adjusted by percentage.

Special quotations given for Ironbark Girders, Deck Planking, supplied direct from Bush Mills.

Joist Timber, 2in. to 4in. thick to 12in. wide to 21-ft. long (providing time is given to obtain from bush mill).

SAWN HARDWOOD POSTS. EX YARD.

Fencing.

Shaped tops : Mortised two rails : Each. 5 x 2 : 7ft. 3/3 : 8ft. 3/7 : 6 x 2 3/2.

Split posts, shaped and morticed, 4/–

3 x 2 rails, splayed ends, 3/6.

SAWN HARDWOOD PALINGS.

5ft. 25/–, 6ft. 30/–, per 100.

MAHOGANY AND JARRAH.

4″ dressed and chamfered, per 100 ft. lin., 20/–.

HARDWOOD ARRIS RAILS.

3″ 17/–, 4″ 33/–, per 100ft. lineal.

SHINGLES.

Redwood, 15/– per bundle ; Forest Oak, 90/– per 1000.

STOCK TIMBERS.

Hardwood, 3″ x 2″, 33/6 ; 5″ x 2″, 33/6 ; 8″ x 8″, 7″ x 7″, 41/– per 100 ft. super.

Oregon, per 100 ft. super.

boards ⅜″ thick 21/6 to 31/6 ¾″ thick 37/– to 54/–
½″ thick 26/6 to 39/– 1″ thick 42/– to 62/–

Colonial Pine, ½″ thick 37/6 ; ¾″ thick, 52/– ; 1″ thick, 54/– per 100 super ft.

Cedar, 12 x ½″, 9d. ; 12″ x ¾″, 1/1 ; 12″ x 1″, 1/2 per super ft.

Shelving Colonial pine, 68/– per 100 super ft.

Complete Price Lists on Application. *See* Advts. pp. 23, 27.

JOISTS AND RAFTERS, FLOORS AND ROOFS.

Labor per square of 100-super feet.

Naked Framed Floors, including nails.

Wages, 2/6 per hour.

Spaced 18in.	Material used Inches.	Labor and Nails	Net.
H.W. Ground joists and plates, bedded, level, not framed	5 x 2½	6	6
Ditto and 1st floor, notched on to plates and girders	6 x 2½	8	0
Ditto, framed to chimneys and well-holes ...	6 x 3	10	0
Ditto, common ceiling joists, notched on to plates	4 x 2½	6	0
Spaced 18in. Oregon floor joists, 9 x 3 and 12 x 3		10/– to 12	0
H.W. Intermediate Trimmers to well-holes, &c.		15	0
Pine herring-bone strutting, per foot run ...	2 x 2	1	0
Labor, laying **Flooring boards,** per square, from ...		6/– to 11	0
Ditto, secret nailed, according to width of board		10/– to 12	0

BONDINGS, GLUES, Etc.

Hornex is a glue forming preparation to join all concrete or cement surfaces to wood, 3/– per lb.

Casein, milk extract in 3lb. bags in powder-form like lime, mixed with water, 2/6. 6d. per ½lb. tin.

Tego Glue Bonding in plywood glueing with dry resinous film, a glue film production, 9d. per lb.

Bituminous Bondings or Glues, waterproof, 1/3 per lb.

SHEATHING.

With the advent of Stucco construction on wood frame and the desire to improve the living conditions in weatherboard and cement sheet houses, the necessity arose for a suitable draught proof sheathing.

Sheathing is applied to the exterior of the wooden frame before the erection of the external walling. It is lapped securely at the joints and returned into all window and door openings, virtually enclosing the house in an air proof and waterproof envelope.

Manufacturers recommend for this purpose.

30/30 grade Sisalkraft...	7/9	100	sq. ft.
60/60 „ „	9/9	„	„
S-K Fibreen	14/–	„	„

See Advt.—p. 14.

ROOFS.

Labor, per square.		s.	d.
Spaced 18in. common shed or lean-to roof, for slates or tiles	4 x 2	6	0
3-feet ditto, ditto, for galv. iron	4 x 2½	3	6
Two-storey gable roof, cut to ridge, pole or wall-plates	4 x 2½	8	0
Ditto, if bevels cut at mills, reckon fixing only ...		4	6
Ditto, hips and valleys		11	0
Ditto, levelling, cutting in pole plates, 2in. x 2in. H.W., per foot run		0	6
For more than 2-storey, add for hauling material and scaffolding, per square		2	0

ONE DAY'S WORK FOR 2 CARPENTERS.

Labor of 2 men. Marking out and cutting 20 squares, 4 hip roofing, cottage, 1 day.

" Striking " or fixing 4 x 2 rafters, 7 x 1 hips and ridges of roofing, 1 day.

Staying with 4 x 3 purlins and 3 x 2 struts and collarties, 1 day.

9in. Fascias 2ft. soffit on bracketing, fit same around, 1 day.

Filling in hip and valley and chimney boards, or gable studs, and minor necessary work. 1 day.

5 days' work for Cottage Roof at 22/– per day each = £11 net.

Add for profit, waste, meterials, nails and incidentals.

WEATHER BOARDS TO COVER 100 Sq. Ft.

200ft. run 7in., 170ft. run 8in., 150ft. run, 9in., 134ft. run, 10in. Allow 1lb. of 2in. 10 gauge nails for 300ft. run of 6in. weatherboard. and ½lb. of 1½in. 12 gauge for 100ft. super of 6in. lining board.

BRIDGE OR WHARF PLANKING.

The brush box is the most suitable kind. Also makes excellent flooring when seasoned. Said to resist the white ants, 38/– per 100.

ROOF CONSTANTS FOR ASCERTAINING THE LENGTH OF RAFTERS AND HIPS.

The Half-Span being Unity, or 1.

	Slope	Angle of Rafter	Angle of Hip	Length of Rafter	Length of Hip	Height of Roof
		deg. min.	deg. min.			
Rise ⅛ span	... 4 to 1	14.	10.2	1.031	1.437	.250
,, ⅙ ,,	... 3 to 1	18.26	13.15	1.054	1.452	.333
,, 1/5 ,,	... 2½ to 1	21.49	15.47	1.077	1.469	.400
,, ¼ ,,	... 2 to 1	26.34	19.27	1.118	1.500	.500
,, ⅓ ,,	... 1½ to 1	33.42	25.14	1.202	1.563	.667
Square roof	... 1 to 1	45.	35.16	1.414	1.732	1.000
Rise ⅔ span	... ¾ to 1	53.8	43.19	1.667	1.943	1.333
,, ¾ ,,	... ⅔ to 1	56.19	46.41	1.803	2.062	1.500
Gothic roof	...	60.	50.56	2.000	2.236	1.732
Rise = span	... ½ to 1	63.27	54.44	2.237	2.449	2.000

Roofs.—To obtain the length of the rafter and hip of a square roof, with a pitch of 1 to 1, from the above table. Assuming the half span to be 13ft., then the rafter will be = 1.414 x 13 = 18.38, or 18ft. 4⅝ins., the hip rafter being 1.732 x 13 = 22.52 = 22ft. 6¼in.

ROOFING.—LABOUR AND NAILS AT 2/9 PER HOUR. CUTTING, BORING & FIXING OREGON.

	per 100 sup. ft. s.	d.
Single span or valley roof over ground floor	20	0
Ditto, for every extra floor, add	1	6
Girders, binders, struts, angle ties, and **curb roofing,** with pole plates, and rafters	18	0
King truss roof, with purlins, &c.	30	0
Queen truss roof, from 30 to 45 feet span, with purlins, &c., over ground floor	35	0
Framed roofing, from 45 to 60 feet span, with principals, king and queen posts, struts and purlins, over ground floors ...	38	0
Ditto, if higher, add for raising, extra, from 20%.		
Ironwork, king bolts, stirrups, straps, &c., per lb., fixed, –/9.		

Laminated semi-circular roof trusses, wrought all sides, painted before being put together, and nailed in thicknesses is worth from 50 to 70 per cent. more than for similar solid framing.

Equilateral Gothic Oregon roof truss, 43 feet span, principals 12 x 6; tie beams 10 x 5, with hammer beams, wrought below collar ties, stop chamfered and fitted; cost price per truss, about £10.

Raising the above with four men, derrick, &c., 30/–. 4 Trusses, £6.

If of H.W. timber, add 25 to 30 per cent. on the roof items for labor.

FLOOR LAYERS.

Labour only, per square of 10ft. x 10ft.

T. & G. Boards	Warehouses, Stores and Factories Punched, cleaned off. H.W.	S. woods.	Halls, Schools, Churches. H.W.	S. woods
	s. d.	s. d.	s. d.	s. d.
6 x 1	5 3	4 4	5 4	4 5
6 x 1¼	5 7	4 6½	5 7	4 8
5 x 1 or 1¼ }	5 7	4 6½	6 0	4 10
5½ x 1 or 1¼ }				
4 x 1	6 1	4 6½	6 7	4 11
4 x 1¼	6 7	4 11	6 10	5 4
4 x 1½	6 8	5 4	7 4	5 10
3½ x 1 or 1¼	6 8	5 10	7 5	6 1
3 x 1 or 1½	7 4	6 2	8 1	6 7
2½ x 1 or 1¼	8 1	6 11	8 6	7 4
2 x 1 or 1¼	8 10	7 4	9 3	7 8

Extra for secret nailing, rate 1½d. on above. Only cutting down, 1/9½. Laying malthoid on open joints, 1/5. Ditto on concrete, 1/–.

	Houses, Banks, Flats, and offices. H.W.	S. wood		S.
	s. d.	s. d.		H.W. woods. s. d. s. d.
6 x 1	5 5	4 6½	4 x 1½	8 1 6 4
6 x 1¼	5 10	4 10	3½ x 1	8 1 6 4
5 x 1	6 4	5 1½	3 x 1	8 6 6 10
4 x 1	6 10	5 8½	2½ x 1	8 10 7 8
4 x 1¼	7 4	6 1	2 x 1	9 6 8 7

T. and G. FLOORING AND LINING

NUMBER OF BOARDS OF DIFFERENT FACE WIDTHS TO COVER 100 SQUARE FEET.

and Number of Nails necessary per Square for Joists 18 inches apart.

A 7-lb. packet 1¾in. x 11 Gauge = 1225 nails or 175 to the lb., and will nail about 4 squares 2 nails to each joist crossing.

280 nails per square = 20 boards 10ft. 6 in. wide = 200ft. run.
308 nails per square = 22 boards 10ft. 5½in. wide = 220ft. run.
420 nails per square = 30 boards 10ft. 4 in. wide = 300ft. run.
480 nails per square = 34½ boards 10ft. 3½in. wide = 345ft. run.
560 nails per square = 40 boards 10ft. 3 in. wide = 400ft. run.
680 nails per square = 48 boards 10ft. 2½in. wide = 400ft. run.

FLOORING.

Covering Capacity of Flooring—Locally Milled.

Lineal feet.	Nominal size.	Finished size.		Super feet.		Square feet.
505	3 x 1	2⅜ x 27/32	Charged as	126	covers	100
505	3 x 1¼	2⅜ x 1-3/32	,, ,,	158	,,	100
356	4 x 1	3⅜ x 27/32	,, ,,	119	,,	100
356	4 x 1¼	3⅜ x 1-3/32	,, ,,	148	,,	100
305	4½ x 1	3-15/16 x 27/32	,, ,,	115	,,	100
305	4½ x 1¼	3-15/16 x 1-3/32	,, ,,	143	,,	100
223	6 x 1	5⅜ x 27/32	,, ,,	112	,,	100
202	6½ x 1	5-15/16 x 27/32	,, ,,	109	,,	100

BALTIC—(IMPORTED MILLED).

				Superface		
200	6 x ⅞ x ¾	6 x ⅞ x ¾	Charged as	100	covers	100
300	4 x ⅞ x ¾	4 x ⅞ x ¾	,, ,,	100	,,	100

The above covering capacity figures are of course on an actual calculated basis. Buyers when ordering have to add usual percentage provision for wastage in "cutting down" preparatory to laying.

APPROX. NUMBER OF NAILS TO THE POUND.

Size.	Nails per lb.	Size.	Nails per lb.	Size.	Nails per lb.
in.		in.		in.	
1 x 16G	1080	2 x 11G	158	3 x 9G	67
1 x 15G	840	2 x 10G	120	3 x 8G	60
1 x 14G	723	2 x 9G	100	3 x 7G	48
1½ x 14G	460	2½ x 13G	200	3 x 6G	39
1½ x 13G	340	2½ x 12G	150	3½ x 8G	44
1½ x 12G	240	2½ x 11G	130	3½ x 7G	40
1½ x 11G	206	2½ x 10G	100	4 x 7G	35
2 x 14G	280	2½ x 9G	80	4 x 6G	30
2 x 13G	230	2½ x 8G	65	5 x 5G	21
2 x 12G	190	3 x 10G	81	6 x 4G	13

LABOR ONLY AND NAILS TO PINE IN SCANTLINGS.

	Per 100 s. ft. s.	d.
Beams, breast-summers, wall-plates, pole-plates, lintels, templates, sleepers, &c.	10	0
Framing rough ordinary scantlings	15	0
Ditto, wrought by hand	20	0

LABOUR ONLY AND NAILS TO PINE IN SCANTLINGS.

	Per 100 s. ft. s.	d.
Joists, ground, ceiling-floor, or ceiling joists, notched or housed and spiked 7/10 = 70 feet run per square ... ... 8/– to	10	0
Ditto, framed to binding joists, girders, &c.	12	0
Ditto, single-framed floors, trimmed to well holes, chimneys, &c.	13	0
Add for each storey above ground floor	1	0
Partitions, 3in. x 2in., framed 70 lin. ft. ... ... 7/– to	10	0
Ditto, 4 or 5 x 3 70 lin. ft. ... ... 8/– to	12	0
If braced, add for each side...	1	0
Ditto, trussed with king posts, add	4	0
Ditto, with king and queen, add	5	0

N.B.—If in hardwood add from 10 to 20 per cent.

STUDDING FOR PARTITIONS—OREGON.

Spaced 18″ apart per Square.

		Timber	Labour & Nails	
7/10′ lengths	= 70 feet 3 × 2 @ 43/– (per 100 super)	15/–	7/–	= 22/–
7/10′ ,,	= 70 ,, 4 × 2 @ 43/–	20/3	8/–	= 28/3
7/10′ ,,	= 70 ,, 5 × 2 @ 43/–	25/–	8/6	= 33/6
7/10′ ,,	= 70 ,, 6 × 2 @ 43/–	30/–	9/–	= 39/–

If dressed add 1/6 to 2/– per sq.

CENTERING

	Per super ft. s.	d.
Centering for gauged arches, or culverts	1	0
Ditto, small groined arches	1	10
Common centering on 3in. ribs, with inch battens for vaults and large culverts	0	10
Heavy centering, for arches, 15 to 30 feet span	1	5
Centering for concentric segmental (circular) arches of concrete, 16 to 20 feet span, springing from circular iron girders on piers for covered reservoirs, &c., the centering being formed on trussed ribs (radiating in plan) from 3 to 5 feet apart, and covered with colonial pine laggings, 1½in. x 1½in.	1	9
If the same centre is used more than once, the setting and striking should be reckoned and one-half the cost of the centre.		

BOXING FOR CONCRETE.

Cost of Framework for Concrete Plain.

	Per sq. yard. s. d.
Simple slab floor supported on R.S.J.	3 6
Enclosure for covered beams and piers	4/6 to 6 0
Plain walls timbered both sides	3/6 to 5 0
For special intersections of columns, reckon extra according to design and moulding shapes, twice to five times.	
Running moulds, large and plain, 6in. wide, per running yd.	2 6
Ditto, 12in. wide	4 0
Add nett fixing to the cost of redwood mould (from monthly timber price lists) from –/3 per foot run.	

BOXING.

Forming Moulds for Concrete Beams 2 feet high 12in. wide x 10ft. long.

	s. d.
Timber 5 x 10ft. = 50ft. dressed oregon 6in. x 1in., at 45/– per 100 super	11 3
35ft. stirrup pieces 2ft. apart, 2 x 1 oregon, at 7/– per 100 lineal ft.	2 6
40ft. run supporting props, stirrups, &c., 4 x 3 at 38/– per 100 super	15 3
	29 0
Labor, Net	9 0
Moulds for 10ft. beam, Net total	38 0
Or per foot run of beam	3 9

Framed Boarding for Concrete Wall. Each side Wired and Stayed apart.

PER SQUARE.	Per 100 super ft. s. d.
8/10ft. 4 x 2 oregon uprights, 2ft. apart = 80ft. at 27/6 ...	22 0
6 x 1 T. & G. flooring, white pine = 100 super ft. at 46/– ...	46 0
Labor, per square to above, and nails, 1/–	8 0
	76 0

Both sides at 76/– each = 152/– or 13/9 per sq. yd.

Add for fixing, bolting or wiring, and staying, 2/3 per sq. yd. = 16/– per sq. yd. for the first placing in position.

By cutting wires and releasing boarding, the cost is reduced by re-using. The setting and striking only reckoned on primary cost, plus 10 per cent. for waste.

Modern Method for the erection of concrete buildings is made by constructing in the proposed lift well two upright standards or runners 8″ x 3″ oregon each side with a movable stayed tray between of 1½″ oregon boards, angle braced, with ¾″ iron rods to centre 7 feet above, with 2 cross beams 10″ x 2″ oregon uprights, finished grooved rope sheaves at centre and end of bearers running between to carry

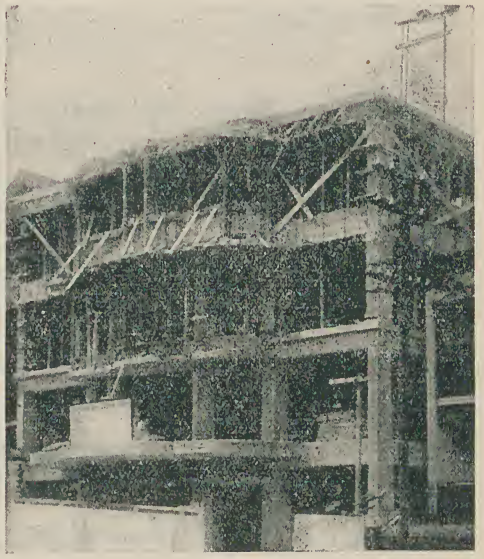
steel wire rope from hauling drum at bottom across the 2 sheaves for raising and lowering the tray platform. All material is carried up floor by floor for concreting and construction.

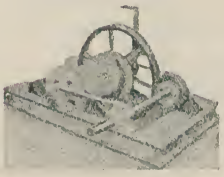
The 8″ x 3″ standards are extended upwards with fish plate and side stays as the work is erected, *see illustration.*

The use of concrete across girders and finished concrete floors for power cranes to sit on supersedes the pre-erected timber tripod stands of 10 years ago.

Where necessary, a cantilever seat for crane is used outside. The outside scaffolding for finishing faces of exteriors is through openings suspended by ropes from projecting R.S.J. above, using for lowering and raising staging a small Crab device.

The Rural bank 12 storey modern upright gothic design was constructed without any R.S.J. cross bearers. The upright (channel iron) standards were erected forming concrete girder boards with reinforced steel rods connecting with uprights. The bluestone and cement concrete placed in position forming the completed cross girders.





Hoisting Machine

EXAMPLES IN ESTIMATING COTTAGE FLOORING AND JOISTING

Per Square, 10ft. x 10ft.

Example No. 1.

	100 lin. ft.	£	s.	d.
H.W. Plate, 3 x 1, = 2/10 = 20ft. run ...	6/9=	0	1	4
Centre Bearer, 4 x 3, 1/10 = 10ft. run ...	33/6=	0	3	4
H.W. Joists, 4 x 2, 7/10 = 70ft. run ...	22/4=	0	15	8
Flooring, 4 x 1, T. & G. Oregon 110 square feet @	59/–=	3	5	0
Labor, laying joists, bedding plates and nails		0	7	6
Labor, laying flooring		0	6	0
Add for profit, &c.	Net cost	£4	18	10

FLOORING AND JOISTING, per square.

Example No. 2.

	per 100 run	£	s.	d.
H.W. Plates, 3 x 2, 2/10 = 20ft. run ...	16/9=	0	3	4
Centre Bearer, 5 x 3, 1/10 = 10ft. run ...	45/–=	0	4	6
H.W. Joists, 6 x 2, 7/10 = 70ft. run ...	33/6=	1	3	6
Floorboards, 4 x 1, T. & G. Col., plus 10% waste	55/–=	3	0	6
Labour, Joists, –/8, Flooring, 8/–, Nails, 1/–		0	17	0
Add profit, &c.	Net	£5	8	10

FIRST FLOOR.

Example No. 3.

	100 sup.	£	s.	d.
Oregon Joisting, built in 9in. x 2in. = 7/11 = 116 s. ft., 38/–		2	4	0
Floor Boards, 4 x 1, T. & G. Oregon, plus 10 per cent. waste = 110 sq. ft. at 59/–		3	5	0
Labor, joists, plates, per square		0	8	0
Labor, laying floor, per square, 4/–, Nails, 2/–		0	6	0
	Net	£6	3	0

FLAT ROOFS.

Example No. 4.

	£	s.	d.
7 10fts. 5 x 2, H.W. Joists = 70, at 30/– per 100 run ...	1	1	0
4 x 1, T. & G. flooring Rimu, at 46/– per square ...	2	6	0
Laying Joists to slope	0	10	0
Laying Floor Boards	0	8	0
Vulcanite and laying (not 2 ply) to 4/– per yd.	2	5	0
Add profit, waste, haulage, &c. Net	£6	10	0

EXAMPLES FENCING, VARIOUS, per foot run.

Labor, 22/– per day of 8 hours.

No. 1 *Example*— £ s. d.

40 feet H.W. 4ft. Front Cottage Fence.
Mahogany Pickets, D. and C. 4in. x $\frac{7}{8}$in.

90 of 4ft. = 360 l. ft. at 20/– per 100	3	12	0
7 posts 7ft. x 5in. x 2in. @ 3/3 ea.	1	2	9
75ft. dressed rails 3 x 2 at 44/– per 100 ft. run ...	1	13	0
Fancy Gate, 38/–, hinges and catch, 3/6	2	1	6
Net cost material	£8	9	3
Labour, at 2/– per foot	4	0	0
Painting, rails and posts, oiling pickets	4	0	0
Profit and incidentals	4	18	0
	£21	7	3

Net cost, 8/– per foot run.
40ft. of above fence and gate cost about £21 complete.

Dressed Picket Fence.

No. 2 *Example*—40ft. cottage 5ft. fence and gate £ s. d.

Cut plain 5 posts 7ft. x 4 x 4 H.W.=47 s. ft. at 33/6 per 100		15	9
2 rails, 80ft. run of 4in. x 2in. H.W., 35/– super ...		18	10
97 pickets 5ft. spaced 5in. (in-to-out). *See Spacing table*= 490ft. run at 17/6	4	5	9
Labour to 40ft. at 2/–	4	0	0
Pointing both sides, 2/– per ft. run	4	0	0
	14	0	4

Total net=£14/0/4, or net 7/– per foot run.
Add for profit and incidentals.

No. 3 *Example*—

	s.	d.
2ft. 6in. **Close d.d. and beaded Mahogany W.B.,** two 4 x 4 arris rails ... ...:	8	8
2ft. of stone work, 9in. wide, dressed top at 2/6 per cubic ft.	4	4
Net per foot run	13	0

Add for 3ft. wide plain gates, hanging complete, from £2 to £3 each.

No. 4 *Example*—

5ft. 6in. **3-rail Capped Fence,** D. & C. Mahogany Pickets, on H.W. 5 x 2 sill, 5 x 3 posts, including gate to match, painted	16	0
Plain Rubble Walls, under 9in. x 12in. deep, per ft. run...	2	6
Per foot run	18	6

ESTIMATE SAWN HARDWOOD FENCING—6ft. Close Paling. per rod of 16ft. 6in.

No. 5 Example—	s.	d.
2 rails, 16ft. 3in. x 2in. = 32 lin. ft., at 28/– per 100 s. ft.	4	6
2 posts, 9ft. 6in. x 2½in. = 22½ft., at 35/6 per 100 s. ft.	8	0
45 palings, 6ft., at 30/– per 100 (4½in. wide x ½in. space)... (See Table of Spacing.)	13	6
Nails, 6d.; and iron hoops, 2 rows	3	0
Labor, per rod	10	0
Net	39	0
Per foot run, about	2	4

Information pages, *advt.* 23, 27.
Split Posts, 7ft. long, 4/– each.

ESTIMATE OF H.W. WEATHERBOARD FENCING.

Per rod of 16 feet 6in.	s.	d.
2 posts 9ft. x 6in. x 2in. = 18 s. ft. 2 rails 16ft. 6in. x 4 x 2 = 22 s. ft. Struts and sills, every other post=10 s.f. } 50 s.f. at 34/6	17	3
33 dressed Weatherboards, 6ft. x 7in. x 1in. = 198ft. run, 40/– 100 lineal	3 19	0
Add for waste and incidentals	10	0
Labor and nails, per rod	12	0
Equals about 7/2 per foot run=net	5 18	3
If painted, add 3 coats painting, 33ft. x 6ft. (both sides).		
198 s. ft.=22 sq. yds. at 3/– per sq. yd. ... ... (*See Painter.*)	3	6 0
Total net	9	4 3

Cost, painted complete, 11/2 per foot run, net.
If rounded tops, 33 at 2d. each board=extra on rod ... 5/6

6ft. GAL. COR. IRON FENCE.

Similar scantling to last Example.

	per rod £	s.	d.
Timber only, as above		17	3
Labor to fence woodwork		10	0
Eight and a half sheets, 6 gal. iron, at 3/3	1	7	9
Labor to gal. iron, about 100 s. ft.		7	0
Nails, screws and washers		3	0
	3	5	0
If timber only painted, add		15	0
Net cost	4	0	0
Add for profit, incidentals and waste, 25 per cent.	1	0	0
	5	0	0

Net Cost 6/– per foot run. Contract price from 7/– per foot run.

HEAVY H.W. STEPS—DRESSED AND FIXED.

	£	s.	d.
Flight of 38 treads, 12in. x 3in., nosed steps, 4ft. wide, 30ft. close strings, 12in. x 3, housed and bolted.			
Labor only—2 carpenters 52 hours = 1 man 104 hours at 2/9	14	6	0
150 super feet Hardwood, at 40/– per 100 sq. ft.	3	0	0
Bolts ... ... = 9/3 per Step.	0	6	0
	£17	12	0

COTTAGE, H.W. STEPS.

	£	s.	d.
Flight of 14 treads, 12in. x 12in., nosed steps, 4ft. wide, close strings, 12in. x 2in. H.W. ; dressed ; material, 160 s. ft. at 40/– per 100	3	4	0
Labor, 26 hrs. at 2/9, and nails 2/6	3	14	0
Net cost	6	18	0
At 14 treads about = 10/– per step.			

LATTICE.

Rough Lattice Fencing, 3ft. high, with continuous laths, 1½ x ¼ laths, on 3 x 1 H.W. battens top and bottom, in 8ft. spans, 3ft. high, unpainted, per foot run 3 0

CARPENTRY.

Plugging Walls.

Labor only, at 3/– per hour, average tradesman, cottage work. Raking out lime mortar joints in new building, making and fixing plugs for 7in. skirting, 3in. picture rail, 5in. architraves, ordinary room, 48ft. run around walls, one window 5ft. x 3ft. and two doors = 110ft. run of plugging area.

	per foot of skirting length of room	per ft.
Plugging new work, one man, 3 hours, = 9/–	12/– plugs added =	1½d.
Ditto, old plastered walls, one man, 5 hours = 15/–	18/– ,, ,, =	2¼d.
Ditto, cemented walls and joints, one man, 8 hours = 24/–	27/– ,, ,, =	3⅜d.

Add cost about 100 plugs for each room = pine, 2/3 ; cedar, 3/– which works out per running foot plugging 100 feet per room –/3.

Labor only—

Fixing 7in. skirting, 50ft., 4 hours = 12/– about –/3 per ft. run.
Fixing 3in. picture rail, 50ft., 2¾ hours = 8/3, about –/2 per ft. run.
Fixing 4in. architraves, 17ft. per set, 1½ hours = 4/6, about –/3d. per ft. run.
Add cost of plugging above.

VARIOUS WEATHERBOARD WALLS.

Covering only net cost, per square.

	Material per 100 super.	Labor per square	Net.
Weatherboards, Baltic, 7in. chamfered	41/6	6/6	48/–
Weatherboard Hardwood, 7in. dressed, splayed	40/–	8/6	48/6
Weatherboard, Cypress Rustic ...	42/–	7/–	49/–
Mahogany Rustic, dressed, 8 x 1 ...	58/–	9/3	67/3
Oregon, Rustic, 8 x 1	62/–	7/6	69/6
Redwood, Rustic, 8 x 1	83/–	7/–	90/–

Add for studding incidentals, profit, &c., to above.

Value of Labour Required

For erecting Ready Prepared W.B. Cottages.
Three Rooms and Kitchen, from £56.

TIMBER PRICES.

Taken from April 1938 Price List.

Best. 1st Class Standard 12 inches x 1″ thick.
per 100 super feet at yard.

Hoop or White Pine, 63/–. Queensland Kauri, 66/–.
Yellow Pine (American), 90/–. Pacific Maple, Red variety, 71/–.
Genuine N.Z. Kauri Pine, 125/–.
Californian Clear Redwood (Seasoned), 78/–.
Tasmanian Oak, 54/–. Sugar Pine (American), 95/–.

per sq. foot.

Queensland Maple, 1/1.
Siberian Oak, 1/2½.
Silky Oak (Q'land), 9½d.
Putts Pine (Q'land), 9½d.

See Advt., p. 23, 27.

PLYWOODS—3 PLY TIMBER SHEETS.

6′ x 3′ Standard Size Sheets—7s. and 8s. may be obtained.

Per 100 Square Feet.

	Sanded one Side.	Sanded Both Sides.
Pine $\frac{3}{16}$″ thick	22/–	29/–
Oregon $\frac{3}{16}$″ ,, ...	26/–	32/–
Q'land Maple $\frac{3}{16}$″ thick	45/–	—
Pacific Maple $\frac{3}{16}$″ ,, ...	30/–	—
Oak $\frac{3}{16}$″ thick	50/–	—
Q'land Mahogany $\frac{1}{4}$″ thick	—	55/–

Picus or Okoume Mahogany $\frac{3}{16}$″ Nominal. Scraped one Side, 45/–
,, ,, ,, ,, $\frac{1}{4}$″ Full. Scraped two Sides, 65/–

Further particulars, refer Advts. pp. 23, 27.

DONNACONA INSULATING BOARD

The practice of insulating buildings of all types is being adopted by Architects and Engineers to an extent unthought of until comparatively recent years.

There has been a very rapid development in the use of all forms of sheet material, due principally to a radical change in outlook with regard to building. Modern forms of construction have replaced the older methods in which mass and solidity were an essential part ; to-day light sheet-like materials are used for lining a structural frame, which in itself comprises light structural units. This change has naturally brought in its wake further problems such as insulation against heat, cold, sound, vibration, etc. The problem of clothing a structural frame with suitable materials has resulted in much time and research being devoted to producing thin, light sheet materials which are strong and durable ; easy to erect and fix ; materials which can be manufactured in standard units consonant with modern building practice. Thus wood-fibre boards have been developed to fill a very important need in building.

Boards of wood-fibre composition have been available for some years but it is only within the past few years that their latent possibilities have been fully employed and made known, and just as in any form of material or method which meets a public demand, capital, energy and research have been expended to improve and perfect it. An outstanding achievement in this direction has been the development of Donnacona Insulating Board to meet the need for a really efficient and at the same time economical insulating building material. The large size and extreme lightness of the sheets make for speedy application and reduced labour costs.

The natural finish of Donnacona Insulating Board makes it an admirable material for interior decoration. The soft neutral tone diffuses light evenly and provides an excellent background for practically any colour scheme. Its unique and attractive rough-cast surface makes Donnacona invaluable in the creation of distinctive wall treatments. In many cases all vertical joints may be eliminated by horizontal fixing ; the walls may be divided horizontally by means of picture rail, dado rail, and skirting, or horizontal " V " joints formed by bevelling the edges of the sheets may be featured. This method also offers considerable scope for a variety of treatments in the modern manner.

There are many methods of masking or concealing the joints between boards. In general the two principal methods comprise : (a) Covering the joint altogether by means of a coverstrip or fillet ; (b) allowing the joint to show and treating the edges of the board in various ways. The former method imposes a panel treatment for the decoration. The cover strip may be wood, metal or Donnacona. The latter method,

i.e., allowing the joint to show, presupposes that the joints form part of the decorative scheme. In this case the edges of the board may be shaped with a special tool to a bevel edge and when placed together form a " V " joint.

The treatment is equally effective on ceilings and it would seem logical that to admit the presence of a joint goes far towards rendering it acceptable. It is invariably much more difficult to conceal a joint than it is to accept it and feature it as part of the decorative scheme.

To-day proper insulation is considered a necessity to the modern home. Donnacona Insulating Board applied to walls and ceilings keeps out winter cold and summer heat alike. As a result Donnacona Homes are warm in winter and comfortably cool in summer, and in addition retards the passage of sound, creating an atmosphere of restful quiet indoors.

See Agents Advt. page 27.

HUDSON'S READY CUT HOMES (Materials only).

WEATHERBOARD.

Hudson Ready Cut Homes are standardised and are prepared for erection as permanent buildings. They are not portable.

Plans, prices and all details on application direct to Geo. Hudson Pty. Ltd.

All sleeper plates, joists, studs, rafters, etc., are cut and fitted. Doors and windows are fitted with locks and hinges, etc., for placing in position, and verandah posts, plates, barge boards, etc.

A set of plans, and working details are provided which makes the erection a very simple matter, and requires only a slight knowledge of building.

GANTRIES (Labor only).	Per 100 sq. ft. s.	d.
Framework for steam building whips, light timbers	30	0
Gantry for travelling crane, braced, and bolted together, not more than 40ft. high (Oregon) heavy timbers ...	20	0
Add for every 10ft. extra height	0	8

Travelling crane (Oregon) trussed with iron tie rods, bars, &c., about double these prices, including hoisting.

Labor in fixing and hoisting, ironwork, including wheels and axles to ditto, per lb., 3d.

The bolts, dog-irons, &c., will not exceed 8lb. per 100 super feet.

TRIPOD GANTRY TOWERS FOR STATIONARY STEAM DERRICK CRANE.

Materials.

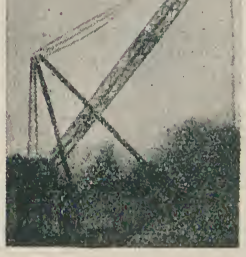
For a 50 Feet Tower to lift 5 to 10 tons.

6ft. x 6ft. double braced and bolted legs, in 10ft. bays, and 50ft. span.

	Lin. ft.	Inches.	sup. ft.
Corner posts, 12 of 50ft. each, 9 x 7 x 2	600	16 x 2	1600
Corner rails, 72 of 6ft.	432	7 x 3	756
Diag. braces, 20 of 15ft.	1800	6 x 2	1800
Sleepers and plates, 12 of 8ft. ...	96	9 x 4	288
Side ties joining legs, 9 of 50ft. ...	450	9 x 3	1012
Side braces, 12 of 80ft.	960	7 x 3	1680
Fish plates, 80 of 6ft.	480	7 x 3	840
Top plates, 3 of 60 ft.	180	10 x 4	600
			85.76
10 per cent. waste			8.57
			94.33
Material, 94.33 s. ft. at 38/–			£180
Labor to above (per 100 super feet, at 20/–) say			100
			£280

For every 10 feet higher, add one-fifth for extra materials and labor in hauling.

Top platform to be added—**Bolts and Iron Straps** for 50 feet, about 70 cwt.



Electric 3-ton Derrick Cranes.

70 feet Steel Jibs

Approx. £850.

In erecting tall buildings the reinforced concrete floors (**built by the aid of tower hoist**) or girder framing of R.S. Joists are used to support cantilevers. Bracket platforms projecting 8 to 10 feet outside building, every 3 or 4 storeys to support light working crane for handling building materials.

Where ground space is **confined or small,** a working platform extending over footpath, or heavy H.W. 9 x 3 cantilever bearers covered with 3in. or 2in. planks, at first floor level.

Also the clever placing of hopper depots and chutes for receiving and distributing building materials is a necessary expense.

100 FEET OREGON TOWER FOR CONCRETE PLACING.

Equipment and Chutes Support.

Example, estimating **single braced** light timber **tower,** 100ft. 8ft. x 8ft.

	s. ft.
4 **Corner Standards** 100ft. 8in. x 2in. and 6in. x 2in. (forming single post 8in. x 8in.)=400 l. ft. 14in. x 2in.	933
12 **bearers** 8ft. x 6in. x 2in., 8ft. apart	385
12 single braces 11ft. x 4in. x 2in. each side=528 l. ft. ...	352
2 runners 3in. x 2in. for guides to elevating or moving platform	100
	1770
If double braced, add 352 s. ft. plus 96 bolts 4½in. x ⅝in., add waste	30
	1800

192 bearer and brace bolts, square heads, 4½ x ⅝ } = 198lbs.
48 standard bolts and nuts }

Labor, cutting bearers, braces, bolting together ready to erect

	£	s.	d.
1 man 80 hours = 10 days			
4 men erecting and fixing plumb 2 days = 8 days			
18 days at 20/-	18	0	0
2 sets of wire rope guys=1020 feet long, 36 lbs. per 100 feet = at £7 per cwt. ... ... Fixing, etc.	12	0	0
1800 s. ft. of oregon ... ... at 40/-	36	0	0
198 lbs. bolts ... ... at -/9 lb.	7	8	6
Net	£73	8	6

IMPORTANT.

Add for incidentals, cartage, striking and profit

A concrete flume distributing mast must be 30 feet higher than top receiver hopper position for freedom in working.

Raising and fixing 7-ton steam derrick crane on to 50ft. derrick in position. **Labor** from £30.

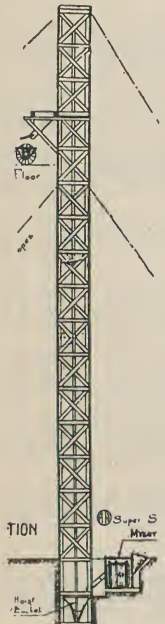
Price of Crane.—See Electrical.

Weighing material, use of small accessory crane for raising and striking to be added.

EXAMPLE.—BRACED TIMBER TOWER.

50ft. x 10ft. x 10ft.
FOR CONCRETE FLUME DISTRIBUTOR.

	Oregon sq. ft.
4 Corner Standards, 9in. x 2in. and 7in. x 2in., forming single post 9in. x 9in.	534
32 bearers, averaging 10ft. 6in. x 2in., 8 bearers each side 6ft. apart	320
56 single braces, 12ft. 4 x 2—14 each side	440
	1550



	£	s.	d.
1550, reckoning oregon 40/–	31	0	0
labor fitting at 20/– per 100	15	10	0
120 bolts $4\frac{1}{2}$ x $\frac{5}{8}$, square heads = 84 lbs.			
20 bolts 10 x $\frac{1}{2}$ = 14lbs. = 98lbs. at –/9	3	13	6
Raising	7	0	0
	£57	3	6

ANGLE IRON DERRICK.

	lbs.
3in. angle iron, 50ft. x 8ft., braced tower.	
450ft. 4ft. x $\frac{1}{2}$ = 12.7lbs. per foot	5715
600ft. 2in. x 2in. x $\frac{1}{4}$ = 3.16 lbs. per foot	1896
	7611

68cwt. at 22/6 per cwt. = £76/10/–;
Planks for platform, 1 square, 3in. thick = 20 sq. ft.

For lighter scantling of angle iron—See Tablesmith.
See steel Tank Stands, Windmill Standards.
See Artesian Wells for tapered Steel Derricks.
See Windmill Tower Construction.

TIMBER MERCHANTS' TABLE OF BOARDS.

To Find the Superficial Contents of **One inch Boards** of different widths.

Boards. Size in inches.	Length of Board in Feet. 5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
3 ...	1.3	1.6	1.9	2.0	2.3	2.6	2.9	3.	3.3	3.6	3.9	4.0	4.3	4.6	4.9	5.0
4 ...	1.8	2.0	2.4	2.8	3.0	3.4	3.8	4.	4.4	4.8	5.0	5.4	5.8	6.0	6.4	6.8
5 ...	2.1	2.6	2.11	3.4	3.9	4.2	4.7	5.	5.5	5.10	6.3	6.8	7.1	7.6	7.11	8.4
6 ...	2.6	3.0	3.6	4.0	4.6	5.0	5.6	6.	6.6	7.0	8.6	8.0	8.6	9.0	9.6	10.0
7 ...	2.11	3.6	4.1	4.8	5.3	5.10	6.5	7.	7.7	8.2	8.9	9.4	10.11	10.6	11.1	11.8
8 ...	3.4	4.0	4.8	5.4	6.0	6.8	7.4	8.	8.8	9.4	10.0	10.8	11.4	12.0	12.8	13.4
9 ...	3.9	4.6	5.3	6.0	6.9	7.6	8.3	9.	9.9	10.6	11.3	12.0	12.9	13.6	14.3	15.0
10 ...	4.2	5.0	5.10	6.8	7.6	8.4	9.2	10.	10.10	11.8	12.6	13.4	14.2	15.0	15.10	16.8
11 ...	4.7	5.6	6.5	7.4	8.3	9.2	10.1	11.	11.11	12.10	13.9	14.8	15.7	16.6	17.5	18.4
12 ...	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.	13.0	14.0	15.0	16.0	17.0	18.0	19.0	20.0
13 ...	5.5	6.6	7.7	8.8	9.9	10.10	11.11	13.	14.1	15.2	16.3	17.4.	18.5	19.6	20.7	21.8
14 ...	5.10	7.0	8.2	9.4	10.6	11.8	12.10	14.	15.2	16.4	17.6	18.8	19.10	21.0	22.2	23.4
15 ...	6.3	7.6	8.9	10.0	11.3	12.6	13.9	15.	16.3	17.6	18.9	20.0	21.3	22.6	23.9	25.0
16 ...	6.8	8.0	9.4	10.8	12.0	13.4	14.8	16.	17.4	18.8	20.0	21.4	22.8	24.0	25.4	26.8
17 ...	7.1	8.6	9.11	11.4	12.9	14.2	15.7	17.	18.5	19.10	21.3	22.8	24.1	25.6	26.11	28.4
18 ...	7.6	9.0	10.6	12.0	13.6	15.0	16.6	18.	19.6	21.0	22.6	24.0	25.6	27.0	28.6	30.0
19 ...	7.11	9.6	11.1	12.8	14.3	15.10	17.5	19.	20.7	22.2	23.9	25.4	26.11	28.6	30.1	31.8
20 ...	8.4	10.0	11.8	13.4	15.0	16.8	18.4	20.	21.8	23.4	25.0	26.8	28.4	30.0	31.8	33.4
21 ...	8.9	10.6	12.3	14.0	15.9	17.6	19.3	21.	22.9	24.6	26.3	28.0	29.9	31.6	33.3	35.0
22 ...	9.2	11.0	12.10	14.8	16.6	18.4	20.2	22.	23.10	25.8	27.6	29.4	31.2	33.0	34.10	36.8
23 ...	9.7	11.6	13.5	15.4	17.3	19.2	21.1	23.	24.11	26.10	28.9	30.8	32.7	34.6	36.5	38.4
24 ...	10.0	12.0	14.0	16.0	18.0	20.0	22.0	24.	26.0	28.0	30.0	32.0	34.0	36.0	38.0	40.0

TABLE CONVERTING SQUARE POSTS AND BEAMS TO SUPERFICIAL MEASURE.

Size Scantling.	Length in Feet. 8	9	10	11	12	14	16	18	20	26	100
4 x 4	10.8	12.0	13.4	14.8	16.	18.8	21.4	24.0	26.8	34.8	134.
5 x 5	16.8	18.9	20.10	22.11	25.	29.2	33.4	37.6	41.8	54.2	209.
6 x 6	24.0	27.0	30.0	33.0	36.	42.0	48.0	54.0	60.0	78.0	300.
7 x 7	32.8	36.9	40.10	44.11	49.	57.2	65.4	73.6	81.8	106.2	409.
8 x 8	42.8	45.6	53.4	58.8	64.	74.8	85.4	96.0	106.8	138.8	534.
9 x 9	54.0	60.9	67.6	74.3	81.	94.6	108.0	121.6	135.0	175.6	675.
10 x 10	66.8	75.0	83.4	91.8	100.	116.8	133.4	150.0	166.8	216.8	834.
11 x 11	80.8	90.9	100.10	110.11	121.	141.2	161.4	181.6	201.9	283.9	1009.
12 x 12	96.0	108.0	120.0	132.0	144.	168.0	192.0	216.0	240.0	312.0	1200.
14 x 14	130.8	147.0	163.4	179.8	196.	228.8	261.4	294.0	326.8	424.8	1634.

TABLE CONVERTING FLOOR, ROOF AND STUD SCANTLINGS TO SUPERFICIAL MEASURE.

Size of scant'g.	Length in Feet. 5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2 x 1½	1.3	1.6	1.9	2.	2.3	2.6	2.9	3.0	3.3	3.6	3.9	4.	4.3	4.6	4.9	5.0
3 x 1½	1.11	2.3	2.8	3.	3.5	3.9	4.2	4.6	4.11	5.3	5.8	6.	6.4	6.8	7.2	7.6
4 x 1½	2.6	3.0	3.6	4.	4.6	5.0	5.6	6.0	6.6	7.0	7.6	8.	8.6	9.0	9.6	10.0
5 x 1½	3.2	3.9	4.5	5.	5.8	6.3	6.11	7.6	8.2	8.9	9.5	10.	10.8	11.3	11.9	12.6
6 x 1½	3.9	4.6	5.3	6.	6.9	7.6	8.3	9.0	9.9	10.6	11.3	12.	12.9	13.0	14.3	15.0
7 x 1½	4.5	5.3	6.2	7.	7.11	8.9	9.8	10.6	11.5	12.3	13.2	14.	14.11	15.9	16.8	17.6
8 x 1½	5.0	6.0	7.0	8.	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.	17.0	18.0	19.0	20.0
9 x 1½	5.8	6.9	7.11	9.	10.2	11.3	12.5	13.6	14.8	15.9	16.11	18.	19.2	20.3	21.4	22.6
10 x 1½	6.3	7.6	8.9	10.	11.3	12.6	13.9	15.0	16.3	17.6	18.9	20.	21.3	22.6	23.9	25.0
11 x 1½		8.3		11.		13.9		16.6		19.3		22.		24.9		27.6
12 x 1½	7.6	9.0	10.6	12.	13.6	15.0	16.6	18.0	19.6	21.0	22.6	24.	25.6	27.0	28.6	30.0
13 x 1½		9.9		13.		16.3		19.6		22.9		26.		29.3		32.6
14 x 1½	8.9	10.6	12.3	14.	15.9	17.6	19.3	21.0	22.9	24.6	26.3	28.	29.9	31.6	33.3	35.0

N.B.—In the odd sizes and lengths the result is given in *full* inches only.

SCANTLING TO SUPERFICIAL.

Size of scant'g.	Length in Feet. 6	7	8	9	10	11	12	13	14	15	16	18	20	22	24	26	28	30	32
2 x 2	2.	2.4	2.8	3.0	3.4	3.8	4.	4.4	4.8	5.0	5.4	6.	6.8	7.4	8.	8.8	9.4	10.	10.8
3 x 2	3.	3.6	4.0	4.6	5.0	5.6	6.	6.6	7.0	7.6	8.0	9.	10.0	11.0	12.	13.0	14.0	15.	16.0
4 x 2	4.	4.8	5.4	6.0	6.8	7.4	8.	8.8	9.4	10.0	10.8	12.	13.4	14.8	16.	17.4	18.8	20.	21.4
5 x 2	5.	5.10	6.8	7.6	8.4	9.2	10.	10.10	11.8	12.6	13.4	15.	16.8	18.4	20.	21.8	23.4	25.	26.8
6 x 2	6.	7.0	8.0	9.0	10.0	11.0	12.	13.0	14.0	15.0	16.0	18.	20.0	22.0	24.	26.0	28.0	30.	32.0
7 x 2	7.	8.2	9.4	10.6	11.8	12.10	14.	15.2	16.4	17.6	18.2	21.	23.4	25.8	28.	30.4	32.8	35.	36.4
8 x 2	8.	9.4	10.8	12.0	13.4	14.8	16.	17.4	18.8	20.0	21.4	24.	26.8	29.4	32.	34.8	37.4	40.	42.8
9 x 2	9.	10.6	12.0	13.6	15.0	16.6	18.	19.6	21.0	22.6	24.0	27.	30.0	33.0	36.	39.0	42.0	45.	48.0
10 x 2	10.	11.8	13.4	15.0	16.8	18.4	20.	21.8	23.4	25.0	26.8	30.	33.4	36.8	40.	43.4	46.8	50.	53.4
11 x 2	11.	12.10	14.8	16.6	17.4	19.2	22.	23.10	25.8	27.6	29.4	33.	34.8	38.4	44.	47.8	51.4	55.	58.8
12 x 2	12.	14.0	16.0	18.0	20.0	22.0	24.	26.0	28.0	30.0	32.0	36.	40.0	44.0	48.	52.0	56.0	60.	64.0

	Length of Scantling in Feet. 6	8	9	10	11	12	13	14	15	16	18	20	22	24	26	28	30	32	34
2 x 2½	2.6	3.4	3.9	4.2	4.7	5.0	5.5	5.10	6.3	6.8	7.6	8.4	9.2	10.0	10.10	11.8	12.6	13.4	14.2
3 x 2½	3.9	5.0	5.8	6.3	6.10	7.6	8.2	8.9	9.5	10.0	11.4	12.6	13.9	15.0	16.4	17.6	18.9	20.0	21.3
4 x 2½	5.0	6.8	7.6	8.4	9.2	10.0	10 10	11.8	12.6	13.4	15.0	16.8	18.4	20.0	21.8	23.4	25.0	26.8	28.4
5 x 2½	6.3	8.4	9.5	10.5	11.6	12.6	13.7	14.7	15.8	16.8	18.9	20.10	22.11	25.0	27.0	29.4	31.3	33.4	35.5
6 x 2½	7.6	10.0	11.4	12.6	13.9	15.0	16.3	17.6	18.9	20.0	22.6	25.0	27.6	30.0	32.6	35.0	37.6	40.0	42.6
7 x 2½	8.9	11.8	13.3	14.7	15.11	17.6	19.0	20.5	21.11	23.4	26.3	29.2	32.2	35.0	38.0	41.0	43.9	46.8	49.7
8 x 2½	10.0	13.4	15.0	16.8	18.4	20.0	21.8	23.4	25.0	26.8	30.0	33.4	36.8	40.0	43.4	46.8	50.0	53.4	56.8
9 x 2½	11.3	15.0	16.9	18.9	20.8	22.6	24.5	26.3	28.2	30.0	33.9	37.6	41.6	45.0	48.9	52.6	56.3	60.0	63.9
10 x 2½	12.6	16.8	18.9	20.10	23.0	25.0	27.1	29.2	31.3	33.4	37.6	41.8	45.10	50.0	54.2	58.4	62.6	66.8	70.10
12 x 2½	15.0	20.0	22.6	25.0	27.6	30.0	32.6	35.0	37.6	40.0	45.0	50.0	55.0	60.0	65.0	70.0	75.0	80.0	85.0

FLOOR, ROOF AND STUD SCANTLING, REDUCED TO SUPERFICIAL MEASURE.

Length in Feet.

Size, in.	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
3 x 3	4.6	5.3	6.	6.9	7.6	8.3	9.	9.9	10.6	11.3	12.	12.9	13.6	14.3	15.	15.9	16.6	17.3	18.
4 x 3	6.0	7.0	8.	9.0	10.0	11.0	12.	13.0	14.0	15.0	16.	17.0	18.0	19.0	20.	21.0	22.0	23.0	24.
5 x 3	7.6	8.9	10.	11.3	12.6	13.9	15.	16.3	17.6	18.9	20.	21.3	22.6	23.9	25.	26.3	27.6	28.9	30.
6 x 3	9.0	10.6	12.	13.6	15.0	16.6	18.	19.6	21.0	22.6	24.	25.6	27.0	28.6	30.	31.6	33.0	34.6	36.
7 x 3	10.6	12.3	14.	15.9	17.6	19.3	21.	22.9	24.6	26.3	28.	29.9	31.6	33.3	35.	36.9	38.6	40.3	42.
8 x 3	12.0	14.0	16.	18.0	20.0	22.0	24.	26.0	28.0	30.0	32.	34.0	36.0	38.0	40.	42.0	44.0	46.0	48.
9 x 3	13.6	15.9	18.	20.3	22.6	24.9	27.	29.3	31.6	33.9	36.	38.3	40.6	42.9	45.	47.3	49.6	51.9	54.
10 x 3	15.0	17.6	20.	22.6	25.0	27.6	30.	32.6	35.0	37.6	40.	42.6	45.0	47.6	50.	52.6	55.0	57.6	60.
11 x 3	16.6	19.3	22.	24.9	27.6	30.3	33.	35.9	38.6	41.3	44.	46.9	49.6	52.3	55.	57.9	60.6	63.3	66.
12 x 3	18.0	21.0	24.	27.0	30.0	33.0	36.	39.0	42.0	35.0	48.	51.0	54.0	57.0	60.	63.0	66.0	69.0	72

Length in Feet.

	26	28	30	32	36	40	42	45	48	50	55	60	65	70	75	80	100
3 x 3	19.6	21.	22.6	24.	25.6	30.	31.6	33.9	36.	37.6	41.3	45.	48.9	52.6	56.3	60.	75.
4 x 3	26.0	28.	30.0	32.	34.0	40.	42.0	45.0	58.	50.	55.0	60.	65.0	70.0	75.0	80.	100.
5 x 3	32.6	35.	37.6	40.	42.6	50.	52.6	56.3	60.	62.6	68.9	75.	81.3	87.6	93.9	100.	125.
6 x 3	39.0	42.	35.0	48.	51.0	60.	63.0	67.6	72.	75.0	82.6	90.	97.6	105.0	112.6	120.	150.
7 x 3	45.6	49.	52.6	56.	58.6	70.	73.6	78.9	84.	87.6	96.3	105.	113.9	122.6	131.3	140.	175.
8 x 3	52.0	56.	60.0	64.	68.0	80.	84.0	90.0	96.	100.0	110.0	120.	130.0	140.0	150.0	160.	200.
9 x 3	58.6	63.	67.6	72.	76.6	90.	94.6	101.3	108.	112.6	123.9	135.	146.3	157.6	168.9	180.	225.
10 x 3	65.0	70.	75.0	80.	85.0	100.	105.0	112.6	120.	125.0	137.6	150.	162.6	175.0	187.5	200.	250.
11 x 3	71.6	77.	82.6	88.	93.6	110.	115.6	123.9	132.	137.6	151.3	165.	178.9	192.6	206.3	220.	275.
12 x 3	78.0	84.	90.0	96.	102.0	120.	126.0	135.0	144.	150.0	165.0	180.	195.0	210.0	225.0	240.	300.

SPACING TABLE.

Showing the **nearest number** of Hooks, Spikes, Laths, Dental Blocks, Pickets, Battens, Palings, &c., required when spaced in a **given length** (starting and finishing with **one**).

(Note.—If not starting with **one**, deduct it on Table).

Given length in feet	Spacing in Inches. 3	4	5	6	7	8	9	10	11	12	13	14	15
5	21	16	13	11	9	9	8	7	6	6	6	5	5
6	25	19	15	13	11	10	9	8	7	7	7	6	6
7	29	22	17	15	13	12	10	9	8	8	8	7	7
8	33	25	20	17	15	13	11	10	9	9	9	8	7
9	37	28	23	19	17	15	13	12	11	10	9	8	8
10	41	31	25	21	18	16	14	13	12	11	10	9	9
11	45	34	29	23	20	18	15	14	13	12	11	10	10
12	49	37	30	25	22	19	17	16	14	13	12	11	11
13	53	40	32	27	23	21	18	17	16	14	13	12	12
14	57	43	34	29	25	22	20	18	17	15	14	13	13
15	61	46	37	31	27	24	21	19	18	16	15	14	14
18	73	55	44	37	32	28	25	23	20	18	17	16	15
20	85	61	49	41	35	31	28	25	23	21	19	18	17
25	101	76	61	51	44	39	34	31	29	26	24	22	21
30	121	91	73	61	52	46	41	37	34	31	29	27	25
35	141	106	85	71	61	54	48	43	39	36	33	31	29
40	161	121	97	81	69	61	55	49	45	41	37	35	33
45	181	136	109	91	78	69	61	55	50	46	41	39	37
50	201	151	121	101	87	76	68	61	56	51	47	44	41
60	241	181	145	121	103	91	81	73	66	62	56	52	49
70	281	211	169	141	121	106	93	85	77	71	65	61	57
80	321	241	193	161	138	121	107	97	88	81	74	69	65
90	361	271	217	181	155	136	121	109	99	91	84	78	72
100	401	301	241	201	172	151	134	121	111	101	93	86	81

N.B.—If not starting with one deduct it on table.

The above is a simple division table to save contractor's time.

Example of how to use Spacing Table :—To find number of hooks or pickets, 5 inches apart, in 50 feet (starting and finishing with one) =121—number required. Number of studs or joists, 17 inches apart in 25 feet (starting and finishing with one)=19—number required.

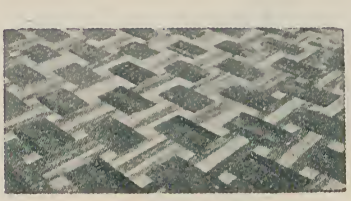
SPACING TABLE.—Useful for finding the **nearest Number** of Pickets, Battens, Studs, Joists, Projections, Sleepers, Posts, &c., in a given length, over 15 inches apart :—

Lin. feet run	Spacing in Inches. 15	16	17	18	20	24	30	36	42	48	60	72
5	5	4	4	4	4	3	3	3	3	3	2	2
6	6	5	5	5	5	4	4	3	3	3	3	3
7	7	7	6	6	6	5	4	4	3	3	3	3
8	7	7	7	7	6	5	5	4	4	3	3	3
9	8	8	8	7	7	6	5	4	4	4	3	3
10	9	9	9	8	7	6	5	5	4	4	3	3
11	10	10	9	9	8	7	6	5	5	4	4	3
12	11	10	9	9	9	7	6	5	5	4	4	4
13	12	11	10	10	9	8	7	6	5	5	4	4
14	13	12	11	11	10	8	7	6	5	5	4	4
15	14	13	12	11	10	9	7	6	6	5	4	4
18	15	15	14	13	12	10	9	7	7	6	5	4
20	17	16	15	15	13	11	9	8	7	6	5	6
25	21	20	19	18	16	14	11	10	9	8	6	5
30	25	24	22	21	19	16	13	11	10	9	7	6
35	29	28	27	25	22	19	15	13	11	10	8	7
40	33	31	30	28	25	21	17	15	13	11	9	8
45	37	35	33	31	28	24	19	16	14	13	10	9
50	41	38	37	35	31	26	21	18	16	14	11	10

If not starting with one, deduct it upon Table.

For Spacing Table up to 1 mile, for fencing posts, or droppers, &c. (*See* WIRE WORKER).

PARQUET OR WOOD BLOCK FLOORING.



Parquetry Flooring represents the best obtainable, and everlasting, at no higher cost than wooden flooring *plus* floor coverings.

Complete stocks of seasoned timbers, such as Tallowwood, Jarrah, Tas. Oak, Blackwood, etc., ensure any design required.

Contracts undertaken and every job guaranteed.

Further particulars on application, refer advt., p. 23.

JOINER.

Measurement.—In all superficial work such as floors, panelled ceilings, framed petitions, walls, &c., for "Labor and Nails," or "Labor only," take the full dimensions, includ;ng chimney breasts, doorways, windows and all spaces not covered, &c., which are not to be deducted, except the opening exceeds 36 superficial feet, when one-half the area only is allowed.

King and queen posts should be taken full size without deductions for waste in cubing or squaring.

See The Rules for Measurement mentioned in Carpentry.

THE COST OF LABOR TO JOINERY—comparative.

Taking **deal** or **clear pine** as a standard—

"**Joinery**" Oregon, fine grain, picked, 10 per cent. more than clear pine.

Oregon (stock) and cyprus pine, 15 per cent. more.

Cedar, Huon Pine, &c., is about 25 per cent.

Tasmanian Blackwood, Queensland Maple, is 35 per cent. more than clear pine.

Oak, American Walnut, Teak, Japanese Oak, 35 to 50 per cent.

Jarrah, Aus. Hardwoods, and Ironbark, from 50 per cent. to 75 per cent.

A GOOD DAY'S WORK FOR A GOOD TRADESMAN.

Set and bed 10 to 12 box frames, ordinary.
Fit and hang 7 to 10 window sashes.
Fit and hang 6 to 9 doors.
Fit, hang and lock 4 to 6 doors.
Set door jambs, 4 to 6 sets.
Fit and hang double slide doors, or fix track for one pair.
Fit and hang single slide doors, 2 pairs.
200 to 300 lin. feet plaster grounds.
100ft. good and 150ft. ordinary picture mould, including plugging walls.
50ft. art shelf 4 x 4 and brackets, not including plugging walls.

DOOR AND CASEMENTS.

Example—Cost of Oregon Door only.

	£	s.	d.
4-panel double, raised moulded door, 7ft. x 3ft. x 1¾in., as joinery work list, 21 sup. ft. at 2/7	2	14	3

See Machinery Joinery List.

PRICE LIST OF FLUSH DOORS, Feb. 1938.

Solid Core Flush Doors. Type A1. Vertical Grain.

	Queensland or Queensland D.S.	Walnut Maple S.S.	For Paint.
6′ 8″ x 2′ 6″ x 1½″	58/4	57/–	52/9 ea.
6′ 8″ x 2′ 8″ x 1½″	62/2	60/8	56/3 ,,
6′ 10″ x 2′ 10″ x 1½″	67/8	66/1	61/3 ,,
7′ 0″ x 3′ 0″ x 1½″	73/6	71/9	66/6 ,,

SOLID SAWN CORE FLUSH DOORS W/– OPENING FOR GLASS TYPE H.

Sizes	Minimum Size of Glass Opening.	Q'land Maple, Walnut Silky Oak, & Red Touriga.		For Paint.	
		2 Bars & Beaded.	Beaded but no Bars.	2 Bars & Beaded.	Beaded no Bars.
6′ 6″ x 2′ 6″ x 1½″	3′ 3″ x 1′ 9″	69/6	58/10	65/7	54/10
6′ 8″ x 2′ 6″ x 1½″	3′ 4″ x 1′ 9″	70/7	60/–	66/6	55/8
6′ 8″ x 2′ 8″ x 1½″	3′ 4″ x 1′ 11″	72/11	62/1	68/7	57/10
6′ 8″ x 2′ 10″ x 1½″	3′ 4″ x 2′ 1″	74/11	64/5	70/5	59/11
6′ 10 x 2′ 10″ x 1½″	3′ 5″ x 2′ 1″	76/1	65/7	71/8	60/3
7′ 0″ x 3′ 0″ x 1½″	3′ 6″ x 2′ 3″	81/5	71/2	79/4	69/2

SINGLE PANEL DOORS W/– VENEERED STYLES & RAILS. TYPE F.V.

All sizes up to 6′ 10″ x 2′ 10″ x 1½″, 60/– ea.
Larger sizes and Special Veneers on Application. *See Advt.* p. 29.

Polishing extra.

Note.—All prices are strictly net.

DOUBLE-SIDED FLUSH PARTITIONS AND WINDOW BACKS.

Height.—Partitions can be constructed in heights up to 7′ 0″ overall from stock size panels.

Kinds of timber.—

Panels to be veneer faced both sides with Queensland Walnut, Maple, Silky Oak, or timber suitable for paint.

Skirting, capping, door frames, mouldings, etc., to be solid run timber of Rose Mahogany, Queensland Maple, and Walnut.

Sizes. Skirting, 9″ x $\frac{13}{16}$″; Skirting Block, 3″ x $\frac{13}{16}$″; Cap Rail, (Oregon) 3$\frac{1}{2}$″ x 2$\frac{3}{4}$″; Capping 3$\frac{1}{2}$″ x $\frac{7}{16}$″.

Door Jambs and Top Rail, 1$\frac{3}{4}$″ x 2$\frac{3}{4}$″; Moulds, $\frac{3}{8}$″ x $\frac{3}{4}$″.

Panels from the following stock sizes, 6′0″ x 2′0″ x $\frac{13}{16}$″ thick. 5′6″ x 1′8″ x $\frac{13}{16}$″ thick. 5′6″ x 1′6″ x $\frac{13}{16}$″ thick. 4′6″ x 1′10″ x $\frac{13}{16}$″ thick. 3′6″ x 1′6″ x $\frac{13}{16}$″ thick x 7 feet high, **Prices as under.**

Panels in Queensland Walnut, Queensland Maple or Silky Oak and Rose Mahogany, allow 35/6 per foot run to 37/6. Allow for painting.

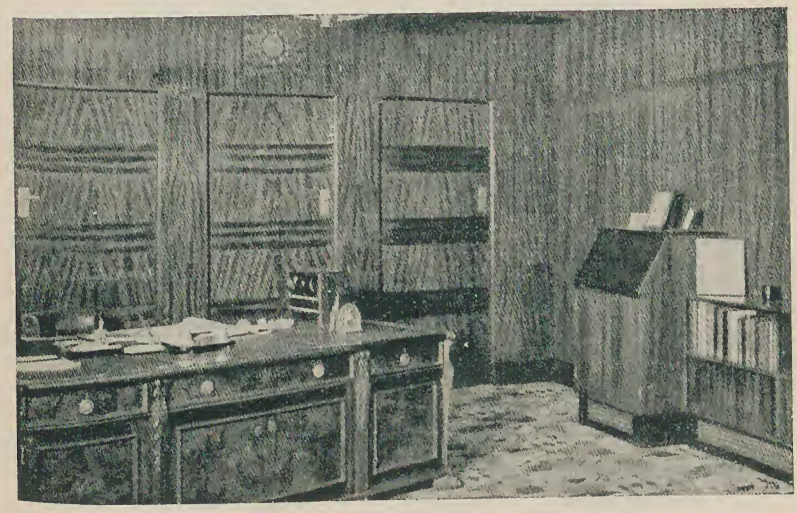
FLUSH WALL PANELLING.

Vertical or Horizontal Grain.

INCLUSIVE OF SOLID RUN SKIRTING, CAPPING AND MOULDS.

Sizes.—The standard overall height of flush panelling to this Specification is 7′0″, made up of skirting, panel and capping. Should greater height be required, special arrangements may be made.

Construction.—Panels to be of 5-ply construction, finished $\frac{13}{16}$″ in thickness on solid core.



ESTIMATING COST, AUGUST 1st, 1937.

Measure over all openings under 20 sq. ft. and allow 26/– to 28/6 for finishing panelling.

PRICES FOR MATERIAL ONLY.

	Qld. Walnut	Qld. Maple
Panels 6′ x 2′ x $\frac{13}{16}$″	2/–	2/– sq. ft.
Grooving, rebating and squaring, 3d. per sq. ft.		
Skirting 9″ x $\frac{13}{16}$″	2/–	1/7½ lin. ft.
Capping 3″ x $\frac{13}{16}$″	1/–	–/7½ ,, ,,
Stop Moulds $\frac{13}{16}$″ x $\frac{13}{16}$″	–/4	–/3¾ ,, ,,
External Angles 6′ x 1¼″	8/–	7/6 each
Inlay Moulds ¼″ x ⅛″	–/1½	–/1½ lin. ft.
Slip Tongues ½″ x ¼″	5/6 per 100 lin. ft.	

POLISHING PRICES FOR PANELS AND SOLIDS.

Lacquer	s. ft.
Open Pore Matt	5¼d.
Filled Matt	9d.
Filled Bright	1/–
Polish Pumice Finish	1/3d.
Polish Paste Finish	1/6d.

JOINERY

DOOR FRAMES.

(*Mill Prices from price list* 1938.)

	Hardwood or Oregon.
5 x 3, Solid Rebated	each 23/–
5 x 3, Ditto, with Transom	,, 31/6
For 5ft. x 8.8ft., high-opening, sq. heads	,, 76/–

FANLIGHTS.

(Redwood—Glazed).

	Thick 1½″		Thick 1½″
2-8 x 1-2	7/–	2-10 x 1-4	7/6
2-8 x 1-4	7/–	3-0 x 1-2	7/6
2-10 x 1-2	7/–	3-4 x 1-4	8/6

STOCK BOX FRAMES.

(Oregon.)

Daylight Sizes.	each.	Daylight Sizes.	each.
10 x 8 ... 3-11¾ x 2- 4	26/6	12 x 14 ... 5-3¾ x 3-4	32/–
10 x 12 ... 4-7¾ x 2-10	28/6	12 x 16 ... 5-11¾ x 3-4	33/6
10 x 14 ... 5-3¾ x 2-10	31/–	10x14x24 5-3¾ x 2-0	27/6
10 x 16 ... 5-11¾ x 2-10	32/–	Double 10x14x24 5-3¾ x 4-6	54/6

Redwood 3/– to 4/– extra.
1/– extra for Wide Sills for Weatherboards.
With 1 x 1 Storm Mould, 3/– extra.
With 1¼ x 1¼ Storm Mould and Turning Piece, 4/6 extra.

VENETIAN SHUTTERS (Minimum 14ft.)

	s.	d.		s.	d.
1½ thick per foot surface...	4	6	1½ Hanging Styles, per set	5	9
1¾ thick, per foot ,, ...	5	0	1¾ Hanging Styles, per set	6	6

(*See Advts.* 23, 27)

GRAVE'S PATENT SPRING BALANCES FOR SOLID FRAMES.

Single Installation.

Balance number, lifting strengths and prices as follows :—

6 lbs., 8-9 lbs., 10-11 lbs., 12-14 lbs. ... ... 14/9 per set
15-16 lbs., 17-18 lbs., 19-20 lbs. ... ... 15/9 ,, ,,
21-23 lbs., 24-26 lbs. ... ... 17/6 ,, ,,

Double installations to 50lb. weight.

Important.—When ordering, mention weight of sash, or size, material, and glass being used ; also if required for side or overhead installation.

MILL PRICES TO ORDER UNFIXED JOINERY.

	per super foot
Window openings, 1¾ sashes and box frames, 6ft. x 3ft. opening 18ft.	4 0
Ditto, above 56 super feet	3 6

Glazing to be added.

Casement Frames and Sashes, 5ft. 6in. x 5ft. 6in. = 30 super. feet, glazed	£7 0 0
Double light or triple light, 6ft. x 5ft., unglazed	£5 10 0

Add for architraves, linings, sill nosing, fittings and fixing, labor.

Casement Frames and Sashes.

5ft. 6in. x 3ft. 9in.	per opening £5/5/–
5ft. 6in. x 5ft. 6in.	,, ,, £7/–/–

Casement Doors, Diminished Styles—Glazed.

Redwood or Clear Oregon, Double Moulded.

7ft. x 3ft. x 1½in. ...	50/–	7ft. x 3ft. x 1½in. ...	52/6
7ft. x 3ft. 4in. x 1½in.	53/–	7ft. x 3ft. 4in. x 1½in. ...	56/–
7ft. x 3ft. 6in. x 1½in. ...	56/–	7ft. x 3ft. 6in. x 1½in. ...	59/–
7ft. x 4ft.	—		

Circular Heads, 4/6 ; Raised panels, 3/6 per pair extra. 1¾ thick, 3/– extra.

DOORS.

Clear Oregon, Square Finish, 3 panels.

See Monthly Price Lists of Mill Joinery for fluctuation of prices.

6ft. 6in. x 2ft. 6in. x 1¾in., 25/– ; 6ft. 8in. x 2ft. 8in., ½in., 25/– ; 6ft. 10in. x 2ft. 10in. x 1¾in., 33/– ; 7ft. x 3ft. x 1¾in., 35/6 ; 7ft. x 3ft. x 2in., 38/6. 4 pan., 1/– extra.

Refer Advts. pp. 23, 27.

LEDGE DOORS.

	Clear Oregon
6ft. 6in. x 2ft. 6in. x 1in.	20/–
6ft. 8in. x 2ft. 8in. x 1in.	21/–
6ft. 10in. x 2ft. 10in. x 1in.	22/–
7ft. 0in. x 3ft. 0in. x 1in.	24/6

Braces extra.

Margin Light—Doors.

CLEAR OREGON.

S165.

6ft. 8in. x 2ft. 8in. x 1½in. 28/6 6ft. 10in. x 2ft. 10in. x 1¾in. 41/–
Ditto, 1¾in.... ... ... 35/– 7ft. 0in. x 3ft. 0in. x 1¾in. 43/6
If in Redwood, 2/–. Packed for safe carriage, 2/– extra.

Bead and Butt.

REDWOOD OR OREGON.

6-8 x 2-8 x 1½in. ... ... 45/6 6-10 x 2-10 x 1¾in. ... 53/6
6-8 x 2-8 x 1¾in. ... ... 50/6 7-0 x 3-0 x 1¾in. ... 57/–
Ledge Doors—Pine ... ... each 18/– to 23/6

FRAMED LEDGE.

	Clear Oregon
6ft. 8in. x 2ft. 8in. x 1¾in.	38/–
6ft. 10in. x 2ft. 10in. x 1¾in.	41/6
7ft. 0in. x 3ft. 0in. x 1¾in.	44/–

RIVERSIDE DOORS (12 or 15 Lights).

CLEAR OREGON.

6ft. 8in. x 2ft. 8in. x 1¾in. 31/6 7ft. 0in. x 3ft. 0in. x 1¾in. 30/–
6ft. 10in. x 2ft. 10in. x 1¾in. 34/6
Add 4/– for Square Fillets, 8 or 10 Lights, 4/6 less, Redwood, extra 2/– each.

FRONT DOORS.

RIVERSIDE DOORS (Pairs) (20 Lights)

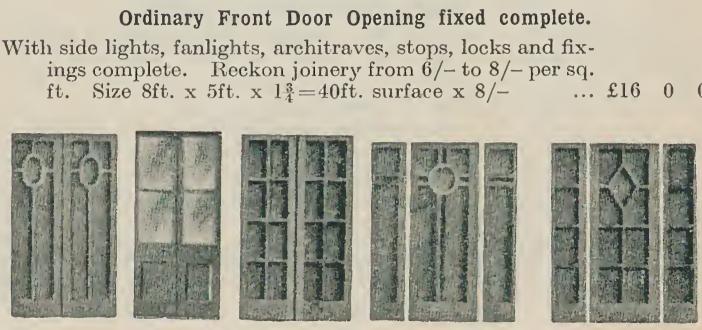
	No. 12	Clear Oregon
6ft. 8in. x 3ft. 6in. x 1½in.	55/6 ...	1¾in. 62/6
6ft. 8in. x 4ft. 0in. x 1½in.	58/– ...	1¾in. 65/6

Redwood Doors, per pair 4/– extra. Add 7/– for Square Fillets.
Packed for safe carriage, minimum charge 4/– per package.

EXAMPLE COST OF

Ordinary Front Door Opening fixed complete.

With side lights, fanlights, architraves, stops, locks and fixings complete. Reckon joinery from 6/– to 8/– per sq. ft. Size 8ft. x 5ft. x 1¾=40ft. surface x 8/– ... £16 0 0



EXAMPLE COST OF INTERNAL DOOR.

Internal 4 pan. Door, fixed complete.

	£	s.	d.
6ft. 8in. x 2ft. 8in. x 1½in.	1	5	6
Set Single Jamb Linings, 1½in.	0	12	6
2 sets architraves	0	9	0
Material	£2	7	0
Labor, 6 hours at 2/9	0	16	6
Lock set, 10/6 ; hinges and nails, 2/–	0	12	6
profit and incidentals	1	4	0
	£5	0	0

Cost of Internal Door, overall measurement.

7ft. x 3ft. = 21 s. feet, including architraves, = about 5/– per sq. ft.

EXAMPLE COST OF

Back Door and Fanlight, fixed.

Overall size opening including architraves, 8ft. 4in. high x 3ft. 4in. wide = 28 sq. feet.

	£	s.	d.
Flush pan. door	2	5	0
5ft. x 3in. H.W. frame, with transom	1	18	0
Glazed fanlight, 2ft. 8in. x 1ft. 2in. x 1in.	0	9	0
1 set 4in. architraves	0	6	0
Hinges, furniture	0	10	6
Labor, 6 hours at 2/9	0	16	6
	£6	5	0
Add profit and incidentals	1	5	0
Approx. 5/4 sq. ft.	£7	10	0

HAND MADE BOX FRAMES AND SASHES.

Labor at 2/9 per hour.

Not glazed, material at 4d. per foot super net.

	Materials. s.	d.	Labour. s.	d.
Pine cased frames, *hardwood* sunk sills, 1½in. moulded sashes, double hung, brass-cased pulleys, patent lines and iron weights	0	10	3	0
Deal-cased frames *hardwood* sunk sills, 1¾in. moulded sashes, double hung, brass cased pulleys, &c. as above	0	11	3	3
Deal-cased frames, double hung, with 2 inch sashes, &c., as before	1	0	3	6
Ditto, with semi-circular head and span-drills, to show square inside	1	0	5	0
Ventilator (small), frame 2 x 1½ blades 2 x ½, 3 inches apart	0	6	7	6
Venetian deal cased frames, *hardwood* sunk sills, 1½ inch moulded sashes, double hung, &c., as above ...	1	0	3	0
Ditto, with 2 inch sashes, ditto	1	1	3	6
Ditto , with 2½ inch sashes, ditto	1	2	4	0

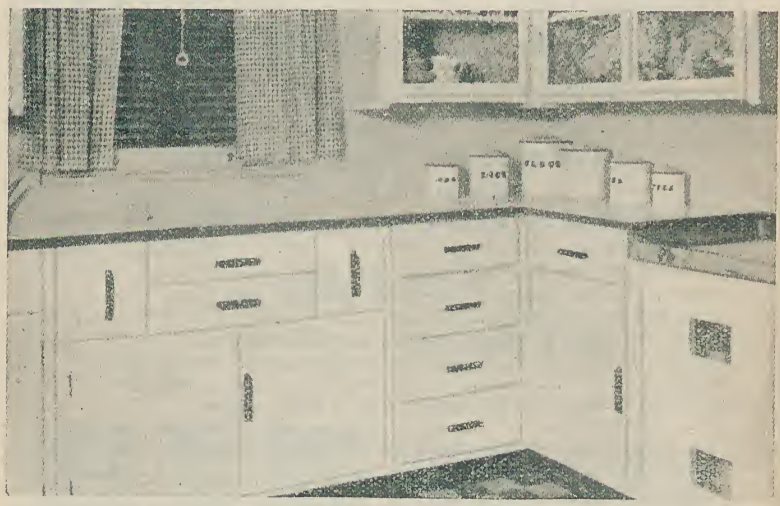
Box Frames, Sashes, per square foot.

	£	s.	d.
Machine stock sizes, sashes 6ft. x 3ft. 6in. x 1½ ; Box frame...	2	3	0
Pair sashes (glazed), 42/– ; nosing, &c., 4/–	2	6	0
18ft. of 5in. Architraves at 30/– per 100	0	6	0
Weights, fittings, cords and nails	0	14	0
Labor, fixing, one man 4 hours at 2/9	0	11	0
Or 21ft. at 5/9 per square foot net	6	0	0
Painting, 3 coats, say	0	12	0
Profit to be added, 10 per cent. At least	0	12	0
21ft. at 6/10 per foot square	£7	4	0

In tendering, reckon finished work from 5/6 to 7/6 per square foot.

Example cost—Verandah or Balcony Enclosure, sliding sashes, 4ft. high x 8ft. spans, three sashes 1¾in. thick, glass 21 oz., H.W. sill and head framed between ver. posts, painted, complete—net cost per sq. ft. £0 4 0

KITCHEN DRAWERS AND CUPBOARDS.



Kitchen drawers and cupboards as above, pine wood—enamelled face and top, £5 5 0 with shelves, doors, hinges and hand lifts Size 7′ long, 3′ high x 1′6″ top and shelves 7′ x 3′=21 super feet at 5/– per face foot.

COUNTERS.

£ s. d.

Example cost—Counter, 9ft. long, mock panelled and moulded; framed front 3ft. x 1½in. thick; pine top 1ft. 9in. wide x 1¾in. thick, covered with linoleum, 5/- per yard per foot run 3 0 0

Example cost—Counter framed, raised md. and panelled pine front, top 2ft. x 2in. thick, with carved brackets every 3ft. apart, per foot run 4 0 0

Counters, 2ft. 6in. wide, from £3 per foot run, plain and framed.

Electric floor surfacers trained operators for hire. Garnet Paper supplied. for the sum of £3 per day of eight hours. These machines usually surface from 200 to 400 square feet per day—depending on the condition of the flooring and the finish desired. Refer *advt.* page 23.

per foot super.

Prices based on: *Dressed timber*, -/4 per ft.; *labor* at 3/- per hour.	Materials. s. d.	Labor. fixing. s. d.
Spandrils—Dadoes.		
1¼in. moulded panelling, wrought one face	0 6	1 8
If less than 3ft. panels, as raking to stairs, add ...	0 1	0 6
If raised, moulded, add	0 2	0 4
Mock panelling about 40 per cent. less for labor.		
Framed Panelling, double-faced, 3ft. panels.		
1½in. deal moulded or square	0 6	2 4
Bead flush and bead butt	0 6	2 6
For every ¼in. thick, add	0 2	0 2
1½in. ditto, circular openings	1 0	4 0

STAIRCASES.

	Complete, per storey. £ s. d.	£ s. d.
12 feet rise.		
Common stairs, oregon, close strings, 1 flight	13 0 0 to	14 0 0
Dog leg stairs, open strings	16 0 0	18 0 0
Stairs, with open strings, return nosings, continued handrail steps about 3½ft. long, 12ft. rooms	28 6 0	30 0 0
Geometrical stairs, with single rail, steps about 5ft. long, ditto	36 0 0	42 0 0
Ditto ditto per step ...	2 10 0	3 10 0

Staircases.	Per foot super. Materials. s. d.	Labor. fixing. s. d.
Inch wgt. steps, risers, and two carriages	0 6	1 4
1¼in. wgt. deal steps, risers, and two carriages ...	0 7	1 5
Ditto, glued, nailed and blocked, with moulded nosings	0 8	1 10
Ditto, mitred to cut string and dove-tailed for balusters	0 9	2 5
Ditto do. and bracketed ...	0 9	4 8
1¼ squared framed spandrils, one side dressed ...	0 6	1 8
Ditto moulded or bead butt	0 7	2 0
3ft. stair (pine), straight flight between walls, fixed ...	£2 per tread	

STAIRCASES.

Extra Items, each.

	Materials. s. d.	Labor. s. d.
Quarter bullnose step glued upright	1 9	12 6
Full bullnose step and riser	3 0	60 0
Returned moulded and mitred nosings	0 3	5 0
Ditto, circular	0 4	8 0
Plain cut brackets, stock pattern	1 3	5 0

String Boards.	Per foot super. s. d.	s. d.
1¼ inch plain wall string	0 5	1 6
1½ inch ditto ditto	0 6	1 8
2 inch ditto ditto	0 8	2 0
If moulded, add...	0 2	0 4
Oregon, 1¼ inch deal, plain outside string, rebated, beaded and framed to newels	0 5	2 0
Ditto sunk and beaded, or moulded	0 5	2 4
Ditto, and mitred to risers	0 5	2 6

Writhed strings, or facia, four times the price of straight for labor and twice for material.

For maple and mahogany, see relative value, Carpenter Section.

Hand Rails, Balusters, Newels, etc.

Maple at 1/3 per s. ft., Labor at 2/6

	Per lin. foot. Materials. s. d.	Labor. s. d.	Total. s. d.
Maple oval 4-inch handrail sunk	1 0	2 6	= 3 6
Pine moulded handrail ditto	0 6	2 0	= 2 6
Ditto do. ramped	1 6	3 6	= 5 0
Ditto swan-neck, or level circular	1 9	4 6	= 6 3
Ditto, solid writhed	2 0	6 0	= 8 0

Half-rails, two-thirds of the whole.

Hand, Rails, Balusters, Newels, etc. (*contd.*)	£	s.	d.
Maple handrail 3in. x 1½in., oval polished to spiral stairs, screwed to iron band, per foot run, fixed...	0	7	6
Ramps to same	0	14	0
Maple handrail 5in. x 4in., special, fixed and polished	0	16	6
Ramps for ditto ditto	1	14	6

Pine or oregon Handrails stock 4in. x 3in., 92/– per 100ft. run.
Balusters 1½in. x 1½in.=16/–; 2 x 2, 20/– per doz.

NEWELS AND BALUSTERS.

	Materials. s. d.	Labor. s. d.
Newel 4-inch mill stock pattern, 5ft. each	10 6	5 0
4in. turned tops or drops for newels, each		5 0
Labor, fixing iron newels, 2½in. dia. x 5ft., each ...		5 0
Ditto iron balusters, light, each	0 0	2 6
Ditto stays, ditto	0 0	1 6

Iron newels, balusters, and stays, charged extra at per lb.

JOINER—FIXING.

SKIRTINGS, ARCHITRAVES.

Including plugging.
Machine made and fixed complete.

	4 inch. s. d.	5 inch. s. d.	6 inch. s. d.	7 inch. s. d.	8 inch. s. d.
Skirtings, moulded ...	0 5	0 6	0 7	0 9	0 10
Architraves, single faced ...	0 6	0 7	0 8	0 11	1 0
Ditto, double faced ...	9 inch	12 inch	14 inch	16 inch	18 inch
Skirtings, double sunk ...		1 0	1 3	1 4	1 6

If made by hand, add one-fourth to these prices.

Fixing architraves or skirtings, costs from 4d. per lineal foot, including plugging and redressing and mitering for 5 inch architraves or 8 inch skirting.

Large Mouldings.

	per super foot. s. d.	s. d.
Base, surbase, double architraves, cornice, and skirting mouldings	1 0	to 2 0
Ditto, if worked by hand	1 6	to 3 0
Church Gothic cornices, worked by hand	2 0	to 3 0

Labour, fixing mouldings from –/1d. per foot, according to lengths, junctions and size.

Shelving for Library or large quantities 12in. x 1in. White Pine, N.Z. Pine, with 2in. x 1in. nosing cedar or maple, partitions 5ft. apart, White Pine, 9d. per foot, per sup. foot, 1/4. Carpenter's wage, 2/9 per hour.

ROOF VENTILATORS.

Joiner's Wage, 2/9 per hour.

	Material. s. d.	Labour. s. d.
Ventilator for side of roof, 3 feet equilateral triangle, and 4 ft. ridge-roll frame 2 x 1½ nailed together, and filled with 3½ x ¾ Louvre, sides covered with Redwood T. and G. flooring. Gal. iron costs about 40/–.	44 0	
Front of Pews, 8 ft. x 2 ft. 9in. x 1½ in. stiles muntins and rails stop chamfered on face, also 6 diagonal V grooved 1 in. panels, flush and chamfered at back, per foot super	3 0	
Pew backs, 8 ft. x 20 ins. x 1½ in. face stop chamfered, three 1 in. bead and flush panels, per foot super	3 0	
Seat for ditto, 8 ft. x 12 ins. x 1½ in., with rounded edge, supported at ends and by 2 seats, per foot run	2 0	
Pew backs, open, as before, without panels, per foot run	2 6	

Church seats, Pine, from 10/– per foot run, 8 feet long, including stall ends, 20/–.

PLUGGING.

The old method of **wood** and **joint** plugging with damage to walls that involve plastering up and making good has been superseded by the working of the pneumatic drill-bit and new Rawlplug method, especially when tiled walls, or fine expensive surfaces have to be punctured for fixtures. Rawl plugs hold better, requires from one half to three quarters less time to instal. The plug being in the solid substance, of wall and not in a joint hold better. They do not damage the walls or existing decorations. By a small hammer and Rawl drill, the hole required is drilled smaller than the head of screw required.

RAWL PLUG MECHANICAL HAMMER.

Complete with No. 8 and No. 14 Hammer Drills. 65/– each.

Makes the jumping of holes speedier, easier and neater.

Can be used in brick, stone, concrete, tiles, etc.

Builders, Electricians and all men who are called upon to carry out large numbers of fixing jobs will find that the Rawl Plug Mechanical Hammer saves a very considerable amount of time and money. With the aid of this hammer a hole 2 inches deep by ¼in. diameter can be made in the hardest material in about half a minute.

Special Rawl Drills to fit Mechanical Hammer.

No.	3	6	8	10	12	14	16	18	20	
	12/–	13/–	14/–	15/–	16/–	17/–	27/–	29/–	31/–	doz.

Further information, refer agents adv. p. 4.

RAWL PLUGS.

(In Boxes of 100).

Size	Suitable Sizes of Screws	Length of Rawl Plugs.						
		½″	⅝″	¾″	1″	1½″	2″	2½″
3	No. 3, 2 and 1	2/8	2/10	3/–	3/4			
6	,, 6, 5 and 4	3/–	3/2	3/6	4/–			
8	,, 8, 7	3/6	3/10	4/2	4/10	6/–	7/–	
10	,, 10, 9	4/–	4/4	4/8	5/6	6/10	8/2	
12	,, 12, 11			5/6	6/4	8/–	9/6	
14	,, 14, 13			6/6	7/6	9/6	11/4	
	In Boxes of 50.							
16	No. 16 and 15					6/2	7/4	
18	,, 18 ,, 17				6/–	7/4	8/8	10/–
20	,, 20 ,, 19				7/–	8/6	10/–	11/6

RAWL PLUG OUTFITS.

Popular Outfit—30 Rawl plugs No. 8 assorted lengths, Tool Holder and Drill, Screws, etc. ... ... 2/9 each

Household Outfit—75 Rawl plugs No. 8 assorted lengths, No. 8 Holders for brick and concrete, etc. Screw, nails and hooks ... ... 6/6 ,,

Handyman Outfit—Larger than above. ... ... 10/– ,,

Craftsman Outfit—Larger than above ... ... 12/6 ,,

Prices of Bolt Anchors and Tools, etc. Refer Adv. page 4.

Jumping Bits (or Percussion Drills) are for use in brick, concrete, tile, or in any hard material. They have special fluting through which the dust is automatically ejected from the hole being made. This ensures a perfect hole and prevents the tool from wedging.

The Jumping Bits are ground to an angle for re-sharpening on any hone or grindstone.

Comparison : Hand hammer, 30 blows to minute ; Machine, 3,000 blows.

Rawlplug Gauges ensure the use of the correct size of plug to suit any screw. Price, 4d. each.

METHODS FOR FIXING RAWLPLUGS IN VARIOUS MATERIALS.

Brick, Concrete, Cement, etc.

Use the Rawldrill and toolholder. Hold the tool lightly between the fingers and thumb of the left hand. Use a light hammer, give light quick blows, turning the tool each time to prevent jamming. Do not attempt to force the tool—Simply tap and turn. The hole will then be perfectly round and the wall will not be damaged.

Plaster or Soft Materials.

When fixing to soft plaster, use a Bullet Bit for making the hole and pierce by giving the Rawlplug toolholder careful blows with a hammer of medium weight—do not rotate between the blows. For hard plaster use a Rawldrill and proceed as described under the heading of " Brick." Should the article to be fixed be at all weighty, it is advisable not to trust to plaster, but to drill the hole right through into the brick beyond.

Tiles and Glazed Bricks.

Before proceeding to drill holes in tiles, glazed bricks, etc., it is necessary to remove the glazed surface over the area required for the Rawlplug ; this can be done by holding the tool in the hand and rotating forward and backwards under steady pressure or by using the Rawlplug Tile Drill.

Lath and Plaster Walls.

The best possible fixing to be obtained in Lath and Plaster can be made by taking a long Rawlplug, turn the screw into it to the extent of about $\frac{1}{4}''$, being careful to grip the plug tightly to ensure that it does not split the whole of its length. The plug and screw is then inserted in the wall, the swelling caused by the insertion of the screw will grip the sides of the hole and the screw can be turned home satisfactorily.

Wood.

Rawlplugs are very useful for inserting in stripped screw holes in furniture, etc., where the position of the hole cannot be moved.

WOOD TURNING

TURNERS' WORK.

Turners' wages, 2s. 9d. per hour, and Clear Pine 5d. per sup. foot.

Per pair.	Labour only. s. d.	Clear Pine. s. d.
Tuscan base and Capital for 6 inch column ...	5 0	1 0
Ditto ditto 9 inch column ...	7 0	2 6
Ditto ditto 12 inch column ...	9 0	5 0
Doric base and capital for 6 inch column ...	7 0	1 0
Ditto ditto 9 inch do. ...	9 0	2 6
Ditto ditto 12 inch do. ...	11 6	5 0

Each.	Labour only. s. d.	Clear Pine. s. d.
Ionic base for 6 inch column (major diam.) ...	6 8	0 8
Ditto 9 inch column	8 0	1 6
Ditto 12 inch column	9 4	3 0
Corinthian or Composite base for 6 in. column ...	8 0	0 8
Ditto ditto 9 in. do. ...	10 0	1 6
Ditto ditto 12 in. do. ...	12 0	3 0
Ditto capital for carving 6 in. do. ...	5 4	1 6
Ditto ditto 9 in. do. ...	9 4	3 0
Ditto ditto 12 in. do. ...	13 4	6 0
Newels 3 in. diameter and 4 feet long ...	3 0	1 4
4 in. ditto ditto ...	5 0	2 6
5 in. ditto ditto ...	6 0	3 0
6 in. ditto ditto ...	10 0	4 0
8 in. ditto ditto ...	15 0	7 6
10 in. ditto ditto ...	27 0	12 0
Balusters ordinary for staircases, 2 in. diam. ...	1 4	0 3
Ditto best ditto ditto ...	2 0	0 3½
Ditto, best with spiral column, ditto	8 0	0 4
Ditto for parapets, loggias, &c., 3 in. diameter and 12 ins. high	2 0	0 4
Ditto 4½ in. diameter and 18 ins. high	4 0	0 11
Ditto 6 in. do. and 24 ins. do.	6 8	2 0
Solid ball for finial, &c. 4 ins. diameter ...	5 4	0 6
Ditto do. 8 ins. do.	8 0	1 8
Ditto do. 12 ins. do.	10 8	4 0

COMPARATIVE WEIGHTS AND MEASURES.

BRITISH EQUIVALENTS OF FOREIGN WEIGHTS AND MEASURES.

The following may be regarded as the approximate equivalents.

LINEAL MEASURE

1 Millimetre	= 1/25 Inch
2½ Centimetres	= 1 inch
1 Metre	= 39⅜ inches
1 Kilometre	= 5 furlongs
1⅜ ,,	= 1 mile

AVOIRDUPOIS MEASURE

1 Kilogramme	= 2½ lbs.
1000 ,,	= 1 ton

SQUARE MEASURE

6½ Sq. Centimetres	= 1 sq. inch
1 Sq. Metre	= 10¾ sq. feet

LINEAL MEASUREMENTS, BRITISH AND FOREIGN.

1 inch	= 2.54 centimetres	1 chain	= 20.1168 metres
1 foot	= 30.4699 centimetres	1 chain	= 66 ft. = 100 links
1 yard	= .114499 metre	1 mile	= 5280 feet = 80 chains
1 mile	= 1.6093 kilometres	1 knot	= 6080 ft. per hour

ADELAIDE

July, 1938.

CURRENT PRICES FOR BUILDING MATERIAL.

T. & G. Flooring—Pinus Radiata.

per 100 feet run

3″ x 7/8″	11/–
4″ x 3/4″	15/9
4″ x 7/8″	16/3
4″ x 1 1/8″	24/6
6″ x 3/4″	27/–

per 100 s. ft.

Hoop pine	12″ x 1″	72/3
Red Canadian	12″ x 1″	80/–
Yellow Pine	12″ x 1″	80/–
White Pine	12″ x 1″	73/6

Single Box frames, 1½″ sashes 32″ x 32″, 21 oz. glazed ea. 78/–
„ „ 26″ x 26″ „ „ ea. 67/–

1¾″ sashes and Bars to top sash, 2/6 extra.

Triple Arm Box frames, up to 35 sq. ft. glazed 21 oz. 161/–.

If side sashes slide glazed with 21 oz., 178/–.

Twin Casements 4½ x 3 in. up to 16 sq. ft., 46/3.

Triple Casements 4½ x 3 in. frame up to 24 sq. ft., 62/–.

Matchboard.

4 x 1/2	Beaded & jointed			10/6
4 x 5/8	...	...	...	11/9
6 x 5/8	...	...	...	19/3

per 100 ft. run

Weather boards, Baltic	7″	23/9
Jarrah	...	25/3
Red Pine	...	35/6
Karri	...	21/6

Ledge doors 6′ 8″ x 2′ 8″ x 7/8″, 25/3 if braced 2/6 extra.

2″ Garage Doors, framed 7 x 8 @ 68/6

Covered with board 5/3 extra per door.

Covered with iron, 3/3 per door.

6′ 8″ x 2′ 8″ x 1½, 4 panel D.M. doors, 39/6

6′ 10″ x 2′ 10″ x 1¾, 4 pair D.M. doors, 49/–.

METRIC WEIGHTS AND MEASURES.

Lineal Measures.

The unit for length is the Metre.

	Yds.	Ft.	In.	
10 Millimetres or	0	0	0.3937	equal 1 Centimetre
10 Centimetres or	0	0	3.9370	„ 1 Decimetre
10 Decimetres or	1	0	3.3708	„ 1 Metre
10 Metres or	10	2	9.7079	„ 1 Decametre
10 Decametres or	109	1	1.079	„ 1 Hectometre
10 Hectometres or	1093	1	10.79	„ 1 Kilometre

Weight.

The unit for weight is the Gramme.

	Lb.	Oz.	Drams.
10 Milligrammes or	0	0	0.0056438 equal 1 Centigram
10 Centigrammes or	0	0	0.056438 equal 1 Decigramme
10 Decigrammes or	0	0	0.56438 equal 1 Gramme
10 Grammes or	0	0	5.6438 equal 1 Decagramme
10 Decagrammes or	0	3	6.438 equal 1 Hectogramme
10 Hectogrammes or	2	3	4.38 equal 1 Kilogramme

A Milligramme measures .01543 of a Grain.

Angles, Degrees and tenths for opening of a Two-foot Rule, in inches and quarters.

Ins.	Degrees	Ins.	Degrees.	Ins.	Degrees	Ins.	Degrees	Ins.	Degrees
½	2.4	4¼	20.4	8	39.0	11¾	58.6	15½	80.4
¾	3.6	½	21.6	¼	40.2	12	60.9	¾	82.0
1	4.8	¾	22.8	½	41.5	¼	61.4	16	83.6
¼	6.0	5	24.0	¾	42.8	½	62.8	¼	85.2
½	7.2	¼	25.3	9	44.0	¾	64.2	½	86.9
¾	8.4	½	26.5	¼	45.3	13	65.6	¾	88.5
2	9.6	¾	27.7	½	46.6	¼	67.0	17	90.2
¼	10.8	6	29.0	¾	47.9	½	68.5	¼	91.9
½	12.0	¼	30.2	10	49.2	¾	69.9	½	93.6
¾	13.2	½	31.4	¼	50.6	14	71.4	¾	95.4
3	14.4	¾	32.7	½	51.9	¼	72.9	18	97.2
¼	15.6	7	33.9	¾	53.2	½	74.3	¼	99.0
½	16.8	¼	35.2	11	54.6	¾	75.8	½	100.8
¾	18.0	½	36.4	¼	55.9	15	77.4	¾	102.7
4	19.2	¾	37.7	½	57.3	¼	78.9	19	104.7

N.B.—The tenth of 1 degree varies from one-fiftieth of one-eightieth of an inch.

Memorandum.

Timber merchants quote all boards under one inch thick at surface measurements. One inch thick and over are reduced to the 1 inch or actual superficial measurement. Resawn timber, will be the saw cut less than the nominal size. Dressed timber is sold, not by the finished size, but by the understood trade sizes. Unless otherwise specified dressed timber finishes under nominal sizes as follows :—

Widths	¼″ less
Thicknesses to 2″ (inclusive)	3/16″ ,,
Thicknesses over 2″	¼″ ,,

The above also applies to the finished thickness of ordered joinery.

Fractions of a foot in length when ordered are supered at the next longer length.

CARTAGE AND TRANSPORT

Wages with Dray at 30/– per day of 8 hours.

(Approx. costs only).

	s.	d.
Carting bricks, including loading and unloading, one mile per 1000, with 1-horse loads	5	0
Ditto, add for each mile beyond, per 1000	2	6
Carting slates, sand, lime, or rubbish, per load for one mile, including loading and unloading	6	0
Ditto, add for each mile beyond, per load	3	6
Carting scaffolding, per load, for one mile, including loading and unloading	10	0
Ditto, for each mile beyond first mile, per load	3	6

Wages, 2 horse dray, 30/– per day. Every extra horse, 6/– to 7/6 every day.

Contractors must allot a price per load that will allow of every carter to make at least 30/– per day, single dray.

Haulage of material by carts drawing one way only.	per cub. yd. of muck
Loading from ground, –/8, dumping, –/2 ... –/10	1/3
Hauling per ½ mile 1/2	1/9
2/–	3/–
Cartage on bad roads, per ton, per mile, over 15 miles ...	2s. to 4 0
Ditto, on good roads, ditto, ditto	1/6 to 2 0
Freight by coasting steamers do., do.	0 0½

A horse can draw about 8 tons on an ordinary railway, and 4 tons on a horse-railway, with 6in. x 3in. hardwood rails.

MOTOR LORRIES.

Motor Lorry and driver, 2 ton, hire at £4 per day, petrol, 2/3 per gal., oil 2/– quart.

Motor Lorry, 1 ton (new) say "Morris" motor truck or "International" make. Cost of running (petrol, oil, tyres, wear and tear), first 10,000 miles, –/4½ per mile, second to 25,000 miles, –/6 per mile, after 20,000 from –/8 running and depreciation.

Wages of motor driver, 3/– per hour, for large traction motors. Award rates, £4/10/– per week for 1 ton trucks.

A good driver on ordinary roads can run lorry on 20 miles to gallon.

"Midco" Generating Set for recharging batteries 250 watts, 120 volts, £30 engine £5 battery. *Waugh & Josephson*, 314 Castlereagh St., Sydney.

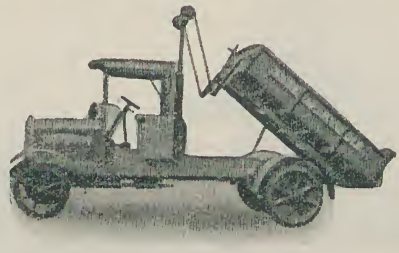
Metal loading from trucks, 8 minutes, per ton of metal.

Metal loading from ground, 10 to 12 minutes per ton of metal.

30 cwt. Motor Lorries, £290, 3 ton, Petrol, £450.
5 ton Petrol, Twin wheel, £650, 10 ton Deizel oil engine, £1050.
A 15-18 cwt. say " Dodge " tipping truck costs £300, self-starter electric light, complete. 1 ton costs £380. 4 ton Chassis, £450.

5 ton motor tractor.
Dumping, say 15 mins.
Loading from hopper, 10 minutes.

Hauling, per mile, 1/4.
Price, £600.



Motor with Tipping Hydraulic Hoist.

(Prices are approximate.)

1 ton " Ford " motor truck, bush roads upkeep, 30/–.
Hire of 1 ton truck and driver per hour, 6/–.

Example—Brick Carting.

A 5 ton motor table truck delivered 1000 bricks per load, 4 miles to job (level road, from Alexandria to Maroubra). Loading and unloading, 4 journeys in 8 hours ; returns empty. Total, 32 miles per day.

Reckon other building materials the same.

MOTOR TRUCK PRICES.

" *Republic,*" with chain tip, double cross-head, 1¼ tons, £400. 1½ tons, £450. 2 tons, £575, 3 tons 4½ tons, £450.

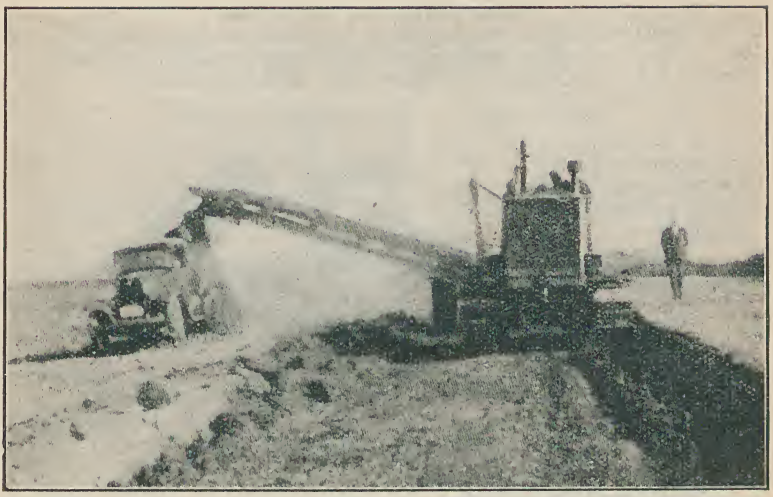
Loading by ½ ton Electric Shovel Excavator direct to 5 ton motor truck, 9d. to 1/– per ton, add for transport 2/– to 4/– per ton per mile.

FUEL CONSUMPTION.

Tests made on a number of cars under average driving conditions to determine the influence of speed on fuel consumption show some interesting results.

Taking the average fuel consumption at a car speed of 40 miles per hour as the standard, increasing the speed to 50 miles per hour increased the fuel consumption 16%. At 60 miles per hour, 34% more fuel was required than at 40 miles per hour. At 70 miles per hour, the increase in fuel consumption was 56% ; that is, this 75% increase in speed was gained at the cost of a 56% increase in fuel required.

There are other items beside speed which affect fuel economy ; viz., quick acceleration, hill climbing, excessive use of brakes, etc. A car capable of 25 honest miles per gallon on tour may give only 15 miles in driving through traffic.



A Cletrac FD and an Austin-elevating grader. The average time loading 18 seconds per 5 ton truck.

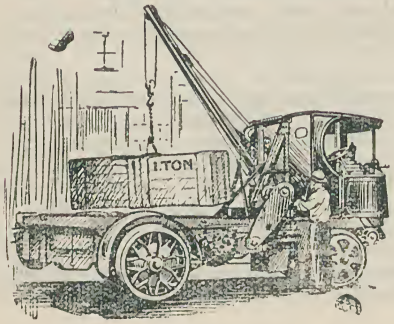
RAILWAY FREIGHTS.

Not less than 8 tons or over, A Rate + 10%.
2 Tons to 8 tons, A Rate.
1 ton to 2 tons, B Rate.
Under 1 ton, 1st Class Rate.

The above applies to all spilt, sawn or dressed timber, and the maximum length allowed is 27 feet in S. Trucks.

TRANSPORT.

The modern haulage wagon is required to give a high average speed, fast speed on hills, must be easy to control, and economical to run.



Steam Waggons. For loads of 3 tons and over, the steam wagon is one of the cheapest means of transport.

4 tons capacity, 4 cub. yds., approx. price, £1100 to £1350; 6 ton capacity 6 cub. yds., approx. price, £1235 to £1440.

Fuel cost, from 1d. per mile.

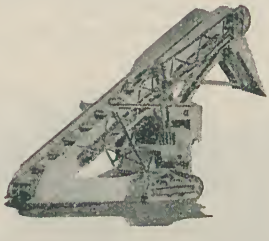
Loading Devices prevent the loss of time which occurs when it is necessary for any vehicle to stand at a loading point while blue metal, sand ar other material is being shovelled in. 4-ton steam wagons or motor vehicles can be loaded in two minutes.

The hopper can be filled in readiness. thus reducing cost of fuel and transport.

Mounted on heavy steel wheels for towing behind lorries. When unloading railway trucks, can be moved without trouble from one to another.

The bin when full is raised so that a vehicle may be backed directly underneath. It facilitates transport capacity of motor vehicles considerably.

Capacity	Price.
4 cub. yds.	£295
6 ,, ...	to
8 ,, ...	£310



LOADING DEVICES AND TRACTORS.

Loaders for handling all classes of Loose Material, Crushed Blocks, Gravel, Sand, also Coal and Coke.

PORTABLE BELT CONVEYORS.

From 20 feet long to 60 feet long. Price, about 20/- per foot run.

Portable Railway Truck or Trolley Waggon Loader, belt and buckets or receivers mounted on wheels or caterpillar traction as desired (*see design*).

According to capacity and particular conditions of loading or, unattended in degree, £800 to £1,500.

Transport, 2 horse and trolley load Trachite City = 12 blocks of trachite, 4ft. x 1ft. 6in. x 9in. = 72 s. ft. x 9 = 54 cubic ft.

The Cartage Rates of Transport in both Sydney and Melbourne are governed by a fixed schedule by the Master Carriers' Associations.

The general rate for measurement of goods is about 5/6 **per ship's ton of 40 cubic feet,** and 4/6 **per ton dead weight,** plus cost of loading and delays, which would depend upon the handling required in receiving and delivering.

FREIGHT RATES (Rail).

per ton over following miles—June, 38.

Quantity	Rate	MILES 50	100	150	200	300	400
8 tons and over	M.	8/9	15/7	20/2	24/9	29/4	33/–
2 tons	A.	15/3	27/4	35/4	43/4	51/4	57/9
1 ton	B.	21/9	39/–	50/5	61/10	73/4	82/6
Under 1 ton	1st Class.	31/4	60/6	85/6	108/5	133/4	150/–

" Cletrac " Crawler Tractors and Waggons.

TRANSPORT.

Excavated material on dump waggons being drawn by a petrol driven motor. Cost of tractor, £1,200.

Traction engines, " Rumley " oil pull, 15-25 h.p., £550.

Ball bearings to wheels and broad tyres, 3ft. 6in. driving wheel and 2ft. front wheels, all gears run in oil, baths enclosed, 20-35 h.p., £775.

Contractors' Covering Tarpaulins, Roped and Branded. "Willesden green or khaki."

Size feet	No. 3 Birkmyre's O M Khaki.	Size feet	No. 3 Birkmyre's O M Khaki.
6 x 8	27/3	18 x 20	200/–
8 x 10	45/9	18 x 24	265/–
10 x 12	68/9	20 x 24	270/–
12 x 14	96/9	22 x 26	320/–
14 x 16	127/3	24 x 26	340/–
16 x 18	160/–	24 x 30	400/–

Or can be hired from 2/– per week.

N.B. 6. This "Willesden" green process is said to be rot, water, and mildew proof.

Agents: *British Bituland, Sydney.*

THE CLETRAC CRAWLER TRACTOR, Cleveland, Ohio, U.S.A. Used by contractors on industrial works, building and maintaining roads, moving earth, hauling logs and lumber, clearing land, pulling stumps, keeping streets and highways clear of snow, ploughing drains and scooping tanks.

Being a low caterpillar tractor, 4ft. 4in. high x 4ft. wide x 8ft. long, it can do the work of 9 horses over any loose country, drawing logs from scrub and supplying the power to saw to cut them in lengths, &c. Price £1050 to £1600.

An 8in. belt pulley runs right on an extension of the motor crank shaft, 20 h.p. direct power for belt driven concrete mixer, saw bench, or stone crushers, &c. Speed, from 600 to 1250 R.P.M.

Motor Heavy duty, four cylinder, 4in. bore overhead valves, one speed, forward and reverse only. **Fuel, gasoline, kerosene, distillate or alcohol.** Petrol tank, 12 gal., high tension magneto. Weight, 3580 lbs. Price, £535.

DISTANCES BETWEEN PORTS OF AUSTRALIA (in Miles).

From Lysaght's Tables.

Fremantle.										
1378	**Adelaide.**									
1886	508	**Melbourne.**								
2450	1072	564	**Sydney.**							
2960	1582	1074	510	**Brisbane.**						
3310	1933	1424	860	350	**Keppel Bay.**					
3500	2122	1614	1050	540	190	**Mackay.**				
3605	2227	1719	1155	645	295	105	**Bowen.**			
3708	2330	1822	1258	748	398	208	103	**Townsville.**		
3868	2490	1982	1418	908	558	368	263	160	**Cairns.**	
3903	2525	2017	1453	943	593	403	298	195	35	**Port Douglas.**
3968	2590	2082	1518	1008	658	468	363	260	100	65 **Cookt'n.**

CEMENT

PORTLAND CEMENT.

The making of Cement from the raw materials—limestone, clay and shale—together with its intricate tests, are matters for the manufacturer and the civil engineer. But a few remarks on how to use it so as to get the best results may be useful. All good cements are exceedingly fine and heavy, and of a bluish grey colour.

Cement Rendering—1 bag and a half of cement, 1 kerosene tin sand, will cover 4¼ sq. yards ½ inch thick, 3 sq. yards ¾ inch thick, 2¼ sq. yards 1 inch thick.

100lbs. of cement, 2 c. ft. of sand mixed, will plaster 6½ sq. yards ½ inch thick, or 4¼ sq. yards ¾ inch thick, 3 sq. yards 1 inch thick.

Cement Plastering should not come in contact with wood, unless protected by tar paper, as otherwise the woodwork swells by absorption of water from the cement mortar, leading to cracking of the cement.

A coating of cement and a small proportion of sand may be applied for protecting ironwork from the effects of steam and gas from engines.

Salt water should not be used for stucco work, or for any work in stables, &c., exposed to the effect of ammonia.

CONCRETE.

For general purposes a mixture of 1 part cement, 3 parts sand, and 6 parts of broken stone or bricks, will produce good concrete.

All concrete should be carefully rammed to eliminate air pockets.

A surplus of water should be avoided, as the strength and the density is affected. The proportion of water is correct if only after thorough ramming the concrete liquid appears on the surface.

When placing a second layer of concrete, it is advisable to do so before the first is set; otherwise the first layer should be scratched, cleaned and wetted for securing a firm bond.

Concrete drying increases strength in ratio one month old, only 50 p.c. of strength, two months old, only 75 p.c. of strength, four months old, only 90 p.c. of strength, six months old, only 95 p.c. of strength, one year old, 100 p.c. or full strength.

Concrete Walls & Blocks.—When moulding these, the operation should be continuous, and care is necessary to completely and tightly fill in the mould. Pork fat prevents the concrete adhering to the mould. After 24 hours the mould can be carefully removed.

MATERIAL.

Portland cement, 94lb. bags, in 10 ton trucks	per ton	£4	13 0
Frolime Hydrated Lime, 50lb. bags	per bag ...		2 6
No. 8 S.W. Gal. Fencing wire for	per ton ...	17	5 0
½in. Mild steel round bars		15	7 6
Sisalkraft Waterproofing paper ...	per square		9 9
4 inch thick compressed cork board in layers	sq. ft.		3 7
2in. ditto	1/6 per s. ft.		1 6

Cement, iron, or steel, when exposed to the same temperature, expand at practically the same ratio ; there need, therefore, be no fear of dislocation—cement protects iron as much against fire as against rust.

Cement is unquestionably the most fireproof material ; whilst wood burns, stone splits, and iron twists, cement resists without injury the highest temperature.

COMPARISON OF SOLID MEASUREMENTS.

1 bushel = 1.28 c. ft. or 4 pecks or 8 gallons = 2 of 4 gal. kerosene tins.

∴ 21.1 bushels = 27 cubic feet or 1 cubic yard.

1 paper bag cement contains 1 c. ft. = 94 lbs., 4 gal. water per c. yd.

1 cubic foot of cement when mixed with aggregates sand and stone

proportion	cub. ft.
1 : 2 : 4	4.1
1 : 2½ : 5	5
1 : 3 : 6	5.8
1 : 4 : 8	7.5

Shrinkage of concrete, 4 : 2 : 1 mix.

One cubic yard material for concrete before mixing in loose, shrinks when set in the proportion of 42 to 27 or 14 to 9.

8 lbs. cement mortar will point one square yard of brickwork with ¼ inch joints.

Plasterers or Distributors of Soil, Ashes, or Material.

COVERING POWER OF ONE CUBIC YARD CONCRETE OR MORTAR IN POSITION AT A GLANCE.

ONE CUBIC YARD OF MIXED MORTAR, CEMENT OR OTHERWISE

Will cover	36	square yards	1	inch thick	
,, ,,	18	,, ,,	2	,, ,,	
,, ,,	15	,, ,,	2½	,, ,,	
,, ,,	12	,, ,,	3	,, ,,	
,, ,,	9	,, ,,	4	,, ,,	say slabs and road gutters
,, ,,	7.2	,, ,,	5	,, ,,	say concrete floors
,, ,,	6	,, ,,	6	,, ,,	
,, ,,	5¼	,, ,,	7	,, ,,	
,, ,,	4½	,, ,,	8	,, ,,	
,, ,,	4	,, ,,	9	,, ,,	say concrete roads or concrete walls
,, ,,	3½	,, ,,	10	,, ,,	
,, ,,	3	,, ,,	12	,, ,,	
,, ,,	2¾	,, ,,	15	,, ,,	
,, ,,	2	,, ,,	18	,, ,,	

One cubic yard of Mixed Mortar, Cement or otherwise

Will cover	36	square yards	1 **inch thick**	say making cement coat to
	45	,, ,,	$\frac{7}{8}$ inch thick	road
	54	,, ,,	$\frac{3}{4}$ inch thick	
	62	,, ,,	$\frac{5}{8}$ inch thick,	say " floating coat " plaster
	72	,, ,,	$\frac{1}{2}$ inch thick,	say top coating bitumen or
	108	,, ,,	$\frac{3}{8}$ inch thick	foot paving
	144	,, ,,	$\frac{1}{4}$ inch thick	
	288	,, ,,	$\frac{1}{8}$ inch thick,	" setting " on finishing coat
	576	,, ,,	$\frac{1}{16}$ inch thick,	of white lime putty.

The smaller thickness for plasterer's coating, bitumen or surfaces, etc.,

Framed Timber standard for chute concreting

One way hollow block reinforced concrete Floor

SHRINKAGE.

Shrinkage to be reckoned from 16 to 12 feet for 5 inches thick work and more for greater quantities or thicknesses.

See Roads Sections Shrinkage for Concrete Kerbing, &c.

From the above table the quantities of material in bulk can be gauged for the covering area only, of inches thick, *not allowing for shrinkage.*

Earthwork, coating, or layers of Ashes, Sawdust, etc.

Quantity to Mix for different thickness of concrete floors, walls, foundations.

14 cubic feet of dry loose metal, sand and cement mixed will make about **9 cubic feet** consolidated concrete only.

Materials for Colouring Cement.

Mixing to one bag of cement produces.

Yellow Ochre, $\frac{1}{2}$ lb. straw, 1 lb. to bag produces dull green.

Yellow Oxide, 1 lb. added a greenish yellow.

Red Oxide, $\frac{1}{2}$ lb. produces pink slate, 1 lb., dull pink, 2 lb., terra-cotta.

MATERIALS FOR COLOURING CEMENT.

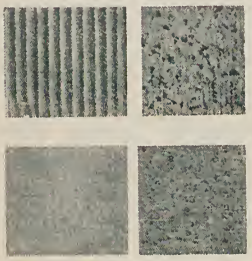
Prussian Blue, ½ lb. produces pale green slate, 1 lb. light blue slate, 2 lb. dark slate.

Lamp black, ½ lb. produces pale slate, 1 lb. dark grey, 2 lb. grey black.

Ultramarine Blue, ½ lb. produces grey, 1 lb. blue grey, 2 lbs. dark blue grey.

The oxides have more permanency, as the acids in cement eat out the colour in time.

" Solpah " is a special red paint for red oxide and cement-finished floors and paths, 2/6 per 1 pint or 9/– per ½ gallon tin.



DECORATIVE CEMENT WORK.

Corrugated Rolls (stamped with gal. iron moulded sheet) broken black specks interspersed (lamp black and cement dried).

See Decorative Plasterer Section.

WATER.

The Metro. Sydney W. & S. charges for water supplied for building and plastering purposes, by meter.

Water consumed, at 11d. per 1,000 gal., minimum charge, 20/–.

Deposit of £5 for hire of meter.

The nominal charge for water supplied for plastering each room of residence, 2/6. For mixing concrete, brickwork or masonry, at 1½d. per cubic yard measured on work.

The charge for concrete foundations, stone cubes, or other form of roadway or pavement, 20/– per 1,000, sq. yds. superficial measurement.

For gas or oil engines, 5/– per 2 h.p. or under, and 6d. extra per h.p. per 1,000 square yards.

COVERING POWER OF 1 BAG OF PORTLAND CEMENT.

1 Hessian bag of Portland Cement = 120 lb. = 1⅓ cubic ft., 18 bags = 1 ton.

1 paper bag of cement = 90 lbs. = 1 cubic ft. = 24 to ton.

Portland Cement	Sand	Mixed = about c. feet.	cover 1 inch thick
1⅓ paper bags	2	= 3.40	= 26 s. ft.
1⅓ ,,	3	= 4.50	= 36 s. ft.
1⅓ ,,	4	= 5.60	= 47 s. ft.

1 to 4 mixture when used as brick mortar will (with a joint of ⅜in.) lay 144 bricks.

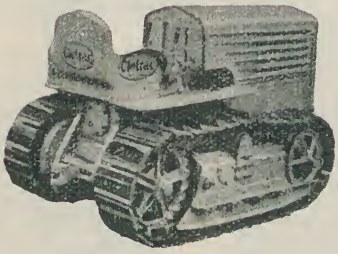
Memorandum.

Weight per cubic ft. in Concrete various 1 : 2 : 4 mix

	c. ft.		lbs.
1 ton river sand	21	Coke breeze ...	60 to 100
1 ton Pit Sand	22	Clinker	110
1 ton Coarse Gravel ...	23	Brick	125
1 ton ¾in. Blue Metal ...	24	¾ Bluestone	144

If reinforced, add weight of metal built in.

1 gallon of water = .16 cub. ft. = 10 lbs., 1 cub. ft. water = 6¼ gal. = 62.4 lbs.



" Cletrac " Crawler Tractors £525 to £2700.

The construction of the great Hume Reservoir on the N.S.W. and Victorian border (3 feet higher than Murray River flood record). Modern methods are now employed in building higher " coffer " dams, where the wall of dam is to intersect hills, so as to divert the river current for about 20 chains to enable the work to be proceeded with.

This is where, in 1860 the late Chas. Mayes, C.E. (the prime author and compiler of the first wonderful six editions of this *Australian Price Book*) laid out, for a private firm, the railway from Echuca to Moama near the Campaspy River.

There to-day, the caterpillar mounted steam " navvy " with dragline method of excavator, traction engines, &c. The conveyor of excavation by belting, &c., and the modern concrete mixers and distributors that all tend for perfection and speed of construction. What a fascinating difference in methods now employed—C. E. Mayes.

CEMENT AND ITS VARIOUS USES.

The Australian Cement Manufacturers Association, 43 Margaret Street, Sydney, will supply free of charge illustrated booklets dealing with the many uses of concrete.

If interested write for your copy at once—*see advt., p.* 28.

CONCRETE

REINFORCED CONCRETE.

A few practical points will be of interest to contractors.

Specially written by M. Stanley, Civil Engineer, to whom I am also indebted for calculated concrete tables included in this edition.

Mould Work.—Before commencing a job, it is always advisable to carefully inspect the plans and designs supplied with the object of determining how far the mould work once fabricated can be re-used as forms for other girders, or floor panels without alteration.

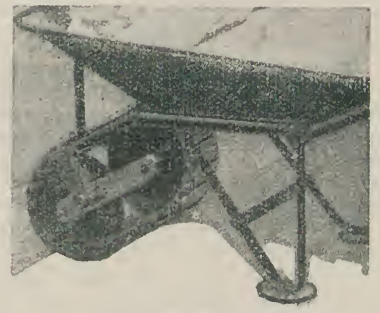
Readjusting of forms, once they have been in contact with concrete the carpenter-work involved costs money. Wherever possible, the timber should be so fitted so that a minimum number of nails are required. The nails when used should *not* be driven home. If the head of the nail is left projecting sufficiently to enable a claw hammer to extract it easily, it will save considerable breakage of forms when stripping. This is a very simple point, but is it one of importance, and most often overlooked. Oiling or whitewashing of forms is to prevent concrete or cement clinging.

The cost of Form Work for a job constitutes the heaviest charge in reinforced concrete work, and the cost can be considerably cheapened by careful preliminary consideration of the plans.

Salvage of Forms.—The timber should be scrubbed and oiled and placed in racks ready for further use. The stripping from the concrete work is considerably simplified.

The method often seen of forcing the timber from the concrete work by the use of heavy bars cannot be too strongly condemned.

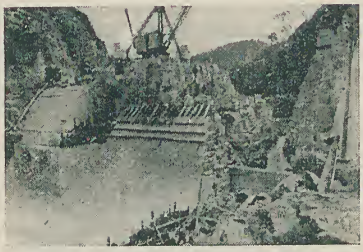
Placing of Concrete.—For the small job, the method in use, viz., the barrowing of concrete from the hoist to its position, is quite satisfactory. If the concrete is mixed too wet, then difficulty is experienced in emptying the barrows—the heavier particles settle into a hard mass. When the concrete is properly mixed, the concrete will leave the barrow easily and without trouble. To watch the placing of concrete by barrows will give the correct idea as to the right proportion of water for a batch. The mixer should be fitted at side with a water measurer.



Roadless Barrow.

In Regard to Mixing.—Excellent Australian mixers are at present on the market which give results equal to the best imported the only point in connection with mixing is to keep the batch in the

mixer long enough to produce an adequate mix. It is far better to over mix than to under mix, and the advantage of machine mixing is its thoroughness and that the human labor is eliminated of the machine drudgery.



Murrumbidgee Dam

Proportions.—The general specification for work of say, 4 : 2 : 1, viz., four parts of a certain size stone metal; two parts by volume of a certain sand; one part by volume of cement.

The intention in proportioning is to introduce just so much sand and cement as will fill the interstices in the metal and should be adopted to produce a dense mix. The sand and cement act as a mortar to bind together the various pieces of metal. The tendency however is to use far too much sand in general construction work, this should be avoided.

Proportions of Mix.—It is generally accepted that 42 cub. ft. of material are required to produce 27 cubic feet or 1 cubic yd. of concrete, and of this 42 cubic feet if four parts of it is to consist of metal, two parts of sand and one part of cement, a 4 : 2 : 1 mix. This means that in a cubic yard of 42 concrete we have 24 cu. ft. of stone, 12 feet of sand and 6 feet of cement, making 42 cubic feet of material.

Placing of Steel Reinforcement.—In strengthening columns, girders, floors, etc., the shape of the steel rods throughout the work varies considerably and it is the work of specially trained men. The placing the steel in its position calls for considerable skill and the contractor is wise who before placing the concrete over any steel system insists on a capable engineer or architectural inspection. The designer of reinforced concrete work and the contractor should act in close collaboration, for once the concrete is poured, it is impossible to see what precisely is the position of the steel rods.

In general, the steel system should be rigidly tied to prevent displacement. Each rod has a particular function to perform, and it can only perform its work when it occupies the position dictated by the design and to hold it in that position should be the object of all the work in concrete.

Generally, the covering for the steel rods varies, depending on the thickness of the slab and may be as small as $\frac{1}{2}$ inch.

Breaking Points in Concrete Work.—The positions where cessation of pouring may occur should be definitely shown on the plan. In

general, these working joints should have a **vertical face** and be located **across the centre of girder** and slab spans. This is the best and most efficient position. It is thought by many that where the working joint is made in a girder the concrete may be permitted to take its natural slope to produce " scarf " joint. This is quite incorrect and is not consistent with good concrete practice.

General Cost of Cubic Yard.

Based on a 4 : 2 : 1 mixture.

Cost of cement, 6 Paper bags at £4/13/– ton ...	1	3	3
Cost of stone 24 cubic feet at 14/– per ton		18	0
Cost of sand, 12 cubic ft. at 7/6		3	9
Material =	2	5	0

Add—

Cost of steel reinforcement, 20/– to 30/– per cubic yard.

Labor, at 2/6 per hour, mixing and placing, 6/– to 10/–, according to length and height.

Labor cost on forms per square yard, 2/6 plain surfaces, to 5/– for beams and columns.

Labor, cost stripping, 6d. to 1/6 per square yard.

Cost of rubbing down (labor and material), 9d. to 1/3 per square yard.

Labor, placing steel, £2 per ton, to £4 per ton.

Strength at different ages of drying, of cement after setting, approximately, 1 month, 60 per cent. of its strength 2 months, 75 per cent., 3 months, 85 per cent., 4 months, 90 per cent., 6 months, 95 per cent. ; strength at 12 months, 100 per cent.

Concrete for small jobs is more cheaply handled by batch mixing machine of 4 cubic feet capacity to skip 4 cubic feet, friction hoist machine, raised and emptied into 2 wheeled iron barrows of 4 cubic feet, and wheeled to points required.

By hoists and chutes, large quantities of concrete in a semi-liquid state can be laid for about 4/– to 8/– per cubic yard.

CENTERING FOR CONCRETE.

All centering must be true and rigid and properly braced. All joints must be fairly tight, so as to prevent leakage of the liquid mass. Waterproofing with asphalt papers or paint can be done very quickly.

The design of centering for floors between beams should be so arranged that the slab form may be removed first, and then the sides of the beams, leaving the beams or girders supported for a long time.

Bevelled strips are used to finish column and beam corners, and " fox," or bevelled wedges between uprights support and ribs or bearers, to raise boards gradually to height desired, and loosen them when concrete has set sufficiently.

Where a watertight concrete is desired, mix in the first layer soft soap and alum, in the proportion of 2 lbs. soft soap and 12 lbs. alum, with 30 gallons of water per c. yd. of concrete. *See also* Index for damp-proof.

Framing for concrete walls, where practicable, should be secured by long bolts through the wall till set. The holes made by bolts to be filled in afterwards.

Dimension of Bottomless Boxes.

MALCOM S. STANLEY, A.M.I.E.A.

Capacity (Cubic Feet) Inside Dimensions.

			inches long
1	cub. ft.	=	12 x 12 x 12
1¼	,,	=	12 x 12 x 15
1½	,,	=	12 x 12 x 18
1¾	,,	=	12 x 12 x 21
			ft. ft. inches
2	cub. ft.	=	2x 1 x12
2¼	,,	=	2x 1 x13½
2½	,,	=	2x 1 x15
2¾	,,	=	2x 1 x16½
3	,,	=	2x 1 x18
3¼	,,	=	2x1.6 x13
3½	,,	=	2x1.6 x14
3¾	,,	=	2x1.6 x15
4	,,	=	2x1.6 x16
1	cub. ft.	=	12x12x12
1¼	,,	=	15x15x 9⅝
1½	,,	=	15x15x11½
1¾	,,	=	15x15x13½

			inches
2	cubic ft.	=	18 x 18 10⅝
2¼	,,	=	18 x 18 x 12
2½	,,	=	18 x 18 x 13⅜
2¾	,,	=	18 x 18 x 14⅝
3	,,	=	18 x 18 x 16
3¼	,,	=	18 x 18 x 17 5/16
3½	,,	=	21 x 21 x 13½
3¾	,,	=	21 x 21 x 14 11/16
4	,,	=	21 x 21 x 15 11/16
1	cub. ft.	=	12 x12 x12
1¼	,,	=	13 7/16 x13 7/16 x12
1½	,,	=	14⅝ x14⅝ x12
1¾	,,	=	15 13/16 x15 13/16 x12
2	,,	=	16 15/16 x15 15/16 x12
2¼	,,	=	18 x18 x12
2½	,,	=	18¾ x18¾ x12
2¾	,,	=	19 9/16 x19 9/16 x12
3	,,	=	20¾ x20¾ x12
3¼	,,	=	21⅝ x21⅝ x12
3½	,,	=	22 7/16 x22 7/16 x12
3¾	,,	=	23 3/16 x23 3/16 x12
4	,,	=	24 x24 x12

WORKABLE SIZES FOR CONCRETE GAUGING FRAMES.

4ft. 6in. x 3ft. x 2ft. = 27 c. ft. or 1 yard.
3ft. x 3ft. x 1ft. 6in. = 13½ c. ft. or ½ yard.
3ft. x 3ft. x 9in. = 6¾ c. ft. or ¼ yard.

Lining Form Work. By lining with a suitable material a considerable amount of time and money is saved in stripping and cleaning after use. " S-K " Iron Bark is extensively used for this purpose and is placed in the timber formwork after erection, immediately before the concrete is poured. It prevents the seeping away of the fine cement paste between the joints and gives a much harder, and denser concrete. The work after stripping is almost as smooth as a rendered finish and if properly tamped will be entirely free from honey-combing. It also eliminates cleaning off slurry from the floors below on completion.

Formwork need not be so tightly cramped when Iron-Bark lining is used, and as no moisture comes in contact with the wood forming itself, the timber lasts very much longer. The surface of Iron Bark is specially treated to prevent adhesion to concrete.

3 Grades—S-K Reinforced Iron Bark	9/9	100 sq. ft.
S-K Duplex „ „	5/–	„ „ „
S-K Single Sht. „ „	1/7½	„ „ „

Refer Adv., page 14.

COST OF CONCRETE BOXING.

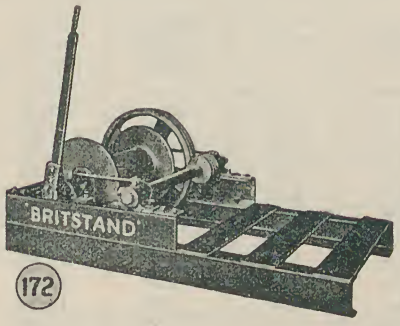
Boxing Beams, per 100 super ft., approximately 60/–.

Boxing Columns with wooden clamps, suspended floors including **braces,** brackets up to 12 ft. high 55/–

Plain surface boarding 50/– per 100 super ft.

Concrete Columns, 4 : 2 : 1, 53/– cub. yd., 5in. floor slabs, 4 : 2 : 1, 47/6 cub. yd.

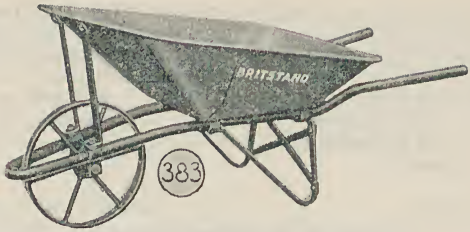
	Fixed per 1000
Facing Concrete with 4½ brick	2 10 0
Curved or half-headers	4 0 0



Approx. £18 to £35

BRITSTAND HOIST.

All types with engine or electric drive or belt drive. Stationery and portable models. Drum capacities according to requirements. Special types for attachment to concrete mixer. Widely used for building or bridge work, etc.



Capacity of barrow, 1/10 cub. yds.	c/ft. 2.7	Large load of metal for barrow	c/ft. 3.0
Average load of broken stone	2.4	Large load of Sand for barrow	3.5
Sand for same wheel barrow	2.5	Load of Metal Concrete for barrow	1.9

Average time of man filling concrete, 4 barrows = 30 minutes.

1 cub. yard concrete mixed, wheeled 50 feet and rammed, 1 man, 4½ hours.

MATERIALS REQUIRED FOR ONE CUBIC YARD OF CONCRETE

Concrete Mixture Parts			Material for one cub. yd.		
Cement	Sand	Stone	Quantity Cement bags	Sand cubic feet	Stone cubic feet
1	1	2.0	10.1	10.5	21.06
1	1	2.5	9.2	9.45	23.63
1	1	3.0	8.3	8.37	25.38
1	1.5	2.5	8.3	12.69	21.06
1	1.5	3.0	7.4	11.34	22.68
1	1.5	4.0	6.3	9.72	25.92
1	2.0	3.0	6.8	14.04	20.79
1	2.0	3.5	6.3	12.96	22.41
1	2.0	4.0	5.8	11.88	23.76
1	2.0	4.5	5.5	11.34	25.11
1	2.5	4.5	5.7	12.96	23.63
1	2.5	5.0	4.8	12.42	24.57
1	2.5	5.5	4.5	11.61	25.38
1	3.0	4.5	4.8	14.58	21.87
1	3.0	5.0	4.5	13.77	22.95
1	3.0	5.5	4.3	12.96	23.76
1	3.0	6.0	4	12.42	24.84

NOTE.—One paper bag of Cement contains 1 cubic foot.
One kerosene Tin contains .65 cubic feet or one half bushel.

Weight per cubic ft. in Concrete various 1 : 2 : 4 mix.

	c. ft.		lbs.
1 ton river sand	21	Coke breeze ...	60 to 100
1 ton Pit Sand	22	Clinker	110
1 ton Coarse Gravel ...	23	Brick	125
1 ton ¾in. Blue Metal ...	24	¾ Bluestone	144

If reinforced, add weight of metal built in.

1 gallon of water = .16 c. ft. = 10 lbs. 1 cubic foot water = 6¼ gal. = 62.4 lbs.

REINFORCED CONCRETE

Reinforced Concrete is now the main factor in all branches of Modern Building construction.

For **twisted surfaces, suspended stairways, overhangs, flat and domed roofs,** and many other forms of construction where lightness and strength are required; tanks, sewer pipes, lighthouse construction, piles, telegraph poles, railway sleepers, kerbs and gutters, silos.

Portland cement, and concrete and steel, co-operate harmoniously together, and produce a combined material stronger in tension, compression and shear strain far superior to its component parts. The concrete protects the steel from corrosion and the steel strengthens the mass.

Many different systems of reinforcement are used, requiring the expert manipulation and the placing of one type or other of the several systems or bars made for the purpose.

SYSTEMS OF REINFORCEMENTS DESCRIBED.

A short description of the principal systems of reinforcing concrete, with prices, so far as I have been able to obtain them by the courtesy of those interested, are appended :—

"**The General**" **System** consists of steel bars placed at given distances apart and crossed at right angles with other bars wired at the intersections. It requires expert designing and manipulation, consequently, detailed prices for general work cannot be given, but a list of special manufacturers with prices affixed will be found on the following pages.

REINFORCING BARS.

IN LENGTHS UP TO 35 ft.

Sizes, dia. $\frac{3}{8}''$, $\frac{1}{2}''$, $\frac{5}{8}''$, $\frac{3}{4}''$, $\frac{7}{8}''$ kept in stock.

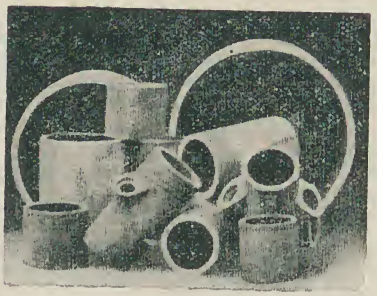
Straight bars in stock lengths or cut to length from $\frac{1}{2}''$ to $\frac{3}{4}''$	per ton	£15	5 0
Bars bent to shape	per ton	£16	5 0
Composite of Straight and Bent Bars of $\frac{3}{4}''$ and $1''$		£16	0 0
Mild Steel rods $1\frac{1}{4}''$ dia.		£17	16 3

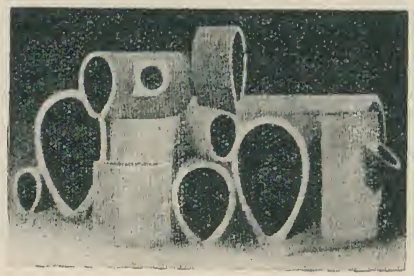
Lengths in excess of 35ft., Extra per ton, Over 35′ up to 40′, 15/–, 40′ up to 50′, £1/5/–, 50′ up to 60′, £2/10/–.

Market Firm—Current Prices on Application. See Advts, pages 5, 6, 12, 31.

Monier Reinforced Concrete Pipes.

in 6′ 0″ lengths.





MONIER REINFORCED CONCRETE PIPES IN 6 FEET LENGTHS.

Inside Diameter of Pipe	Price per lineal foot at Factory	Discharge Area	Approx. Weight per lineal foot	Approx. price per foot run laying.
ft. ins.	s. d.	sq. feet	c q lbs.	s. d.
9	1 10	0.44	0 1 10	8
1 0	2 7	0.78	0 1 26	10
1 3	3 6	1.22	0 2 25	11
1 6	4 6	1.77	1 0 1	1 0
1 9	5 6	2.41	1 1 0	1 2
2 0	6 9	3.14	1 2 2	1 6
2 6	10 0	4.91	2 0 13	2 0
3 0	12 9	7.07	2 3 7	2 6
3 6	16 6	9.62	3 1 19	3 0
4 0	20 6	12.57	4 0 8	4 0
4 6	22 6	15.90	4 3 0	5 3

Factories :

at Erskineville New castle, Port Kembla.

See Advt., p. 12.

For further information and estimates for quantities laid complete·

see Advt. page 12.

EXPANDED STEEL REINFORCEMENT.

Expanded Steel is made in several sizes of mesh and thicknesses of sheets, but for the reinforcement of concrete, the 3in. mesh, of suitable size strands is generally used in floors, staircases and circular forms such as winding stairs, silos, sewer pipes, etc., manufactured in sheets from 8ft. to 16ft. long by 4ft. to 8ft. wide.

SECTIONS USUALLY STOCKED.

List Ref. No.	Size of Mesh	Dimensions of Strands	Approx. Weight per yd. sup.	Area in 1 foot Width	Price s. d.
10	3in.	$\frac{1}{4}$ x $\frac{3}{16}$	11$\frac{1}{4}$lbs.	.375	4 6
61	3in.	$\frac{5}{16}$ x $\frac{1}{8}$	9$\frac{1}{2}$,,	.3125	4 3
8	3in.	$\frac{1}{4}$ x $\frac{1}{8}$	7$\frac{1}{2}$,,	.25	4 0
9	3in.	$\frac{3}{16}$ x $\frac{1}{8}$	5$\frac{3}{4}$,,	.1875	3 9
15	3in.	$\frac{1}{8}$ x $\frac{1}{8}$	3$\frac{3}{4}$,,	.125	2 9

Stock sheets from 16ft. x 6ft. to 8ft. x 4ft. per yard super. For smaller Meshes and Strands, *see* PLASTERER.

THE HUME PATENT REINFORCED CONCRETE PIPE.

N.S.W. Factories : Rydalmere, Tamworth, Harden, Lismore.

PIPE COMP

DESCRIPTION & PRICES OF CONCRETE PIPES.

Price per Lineal foot at works or F.O.R. Rydalmere.

Diameter	Lengths	S. & F.		Butts		No. of feet per ton.
Inches.	feet	N.R.	R.	N.R.	R.	
4	6′	8d.	9d.	8d.	9d.	152
6	3′ 6′	1/–	1/4	1/–	1/4	106
9	3′ 6′	1/10	2/–	1/8	1/10	64
12	3′ 6′	2/4	2/10	2/1	2/7	40
15	4′ 6′ 8′		3/9		3/6	32
16	4′ 8′		4/3		4/–	26
18	,, ,,		4/10		4/6	22
21	,, ,,		5/10		5/6	17
24	,, ,,		7/4		6/9	14

N.R. Signifies Non-Reinforced. R. Reinforced.

The above pipes comply with Dept. of Works. Local Government and Dept. Main Roads Standard Specification.

EXPANDED STEEL DIAMOND MESH.

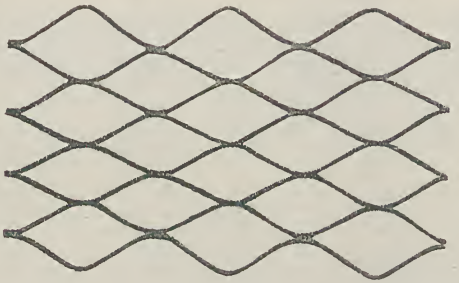
Labor.—Fixing sheets in position, per sq. yd. 5d. to 8d.

Centering for concrete, per sq. yd. 3/– to 5/–

All junctions of sheets in foundation must lap one full mesh (8in.), long way of mesh, and 3in., short way of metal, and at intersecting walls must cross completely. The metal should be laid about 2in. from bottom of concrete, thoroughly embedded, and the concrete well rammed or trodden down.

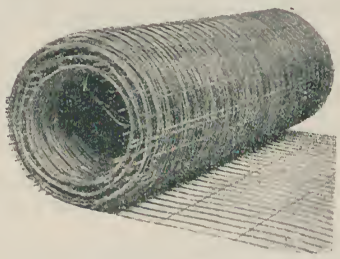
LATTICE REINFORCEMENT.

Lattice for floors, foundations, roads, wall footings, silos, tanks and concrete buildings of every description is manufactured in rolls or panels to specification (not wider than 7ft. 6in.)



WIDTHS OF 3 FEET AND OVER.

No.	Mesh	Gauge	Weights per Sq. Yard.	Price per Sq. Yard.
7	$1\frac{1}{2}$ x 3	13 x 13	$2\frac{3}{4}$ lbs.	3/–
8	$1\frac{1}{2}$ x 3	11 x 11	4 ,,	3/8
9	$1\frac{1}{2}$ x 3	10 x 11	$4\frac{3}{4}$,,	4/–



STEEL WIRE LATTICE FOR ROAD CONSTRUCTION, Etc.

Gauge.	per sq. yd.
3in. x 16in. mesh = 6 x Twin 11 G.W.	1/11
3in. x 16in. mesh = 7 x Twin 11 G.W.	1/10
3in. x 12in. mesh = 7 x Twin 11 G.W.	2/2
3in. x 8in. mesh = 7 x Twin 11 G.W.	2/5

Further Information, Price Lists, etc., on application. *See Advt., p. 5.*

TO CARRY A SAFE WORKING LOAD.

SUSPENDED FLOOR SLABS.

Use No. of Lattice	Thickness of Concrete	1½ cwt. Centre of Support	3 cwt. Centre of support
No. 16	7½ inches	15 feet	11 feet
No. 16	7 ,,	14 ,,	10 ,,
No. 12	6½ ,,	13 ,,	9 ,,
No. 12	6 ,,	12 ,,	8 ,,
No. 14	5 ,,	10 ,,	7 ,,
No. 14	4½ ,,	9 ,,	6 ,,
No. 8	4 ,,	8 ,,	5 ,,
No. 7	3 ,,	6 ,,	4 ,,

Water required in mixing a cubic yard of cement and sandstone concrete is from 30 to 35 gallons, bluestone metal from 25 to 30 gallons.

Mem.—Whenever difficult forms present themselves in buildings, such as entrances with semi-circular arches, circular on plan, or with convex jambs, &c., it will be found that cement rammed concrete, including mould planking, is from one-half to one-third the cost of brickwork in cement.

To prevent cement or concrete from sticking to the moulds, **common soap** dissolved into a thin jelly and applied with a brush to wooden or metal inner faces of " forms " or moulding devices. It can be readily hosed off at completion, leaving the cement face clean to receive finishing coat if required. Oil is unsuitable as it impedes perfect bond at joints and suction required on face to fix a second coat of cement.

Thick lime wash is also found a suitable prevention from sticking for moulds where it does not matter in appearance.

CONCRETE FENCE POSTS.

6ft. 6in. long, tapered 6in. to 4in. x 4in. thick, re-inforced with No. 9 crimp wire. Lay mould solid and tamp concrete inch by inch around wires.

One cubic yard coke concrete at 80/– (depends on the mix) would make 27 posts. Cost per post, about 3/–.

INNES-BELL CONSTRUCTION.

HOLLOW BREEZE BLOCK—TWO WAYS REINFORCING BARS

In any structure frequently the major objective has been its elimination of columns and the use of wider spans.

Wider spans demand larger girders and large girders reduce **head room**

Thus in increasing the distance between columns the designer is compelled to reduce head room. In general, his work lies in effecting a compromise between the column centre and girders dimensions.

This problem is most keenly felt in aerodromes, garages and "Way-outs." The designer has in reinforcing rods frequently to "lay-out" a floor in two ways to get the better result.

M. S. Stanley, A.M.I.E.A., is the consulting engineer for the above company.

"INNES BELL" TWO WAY FLAT SLAB.
HOLLOW BLOCK SLAB SYSTEM.
Prices vary from 4/– to 6/6 per block.

2 Way Block Floors.	Superloads Lbs. per sq. ft.						
		40	60	75	100	150	200
	Thickness	7″	8″	8″	9″	10″	10″
18 x 18	Weight	65	70	70	75	80	80
	Thickness	8″	9″	9″	9″	10″	11″
20 x 20	Weight	70	75	75	75	80	85
	Thickness	9″	9″	10″	10″	11″	12″
22 x 22	Weight	75	75	80	80	85	90
	Thickness	9″	10″	10″	11″	12″	13″
24 x 24	Weight	75	80	80	85	90	95

"INNES BELL" TWO WAY FLAT SLAB—Continued.

2 Way Block Floors.	Superloads Lbs. per sq. ft.					
26 x 26	Thickness	10″	10″	11″	12″	13″	14″
	Weight	80	80	85	90	95	100
28 x 28	Thickness	10″	11″	11″	12″	14″	15″
	Weight	80	85	85	90	100	105
30 x 30	Thickness	11″	12″	12″	14″	15″	17″
	Weight	85	90	90	100	105	115
32 x 32	Thickness	12″	13″	13″	14″	16″	18″
	Weight	90	95	95	100	110	120
34 x 34	Thickness	13″	14″	14″	16″	18″	
	Weight	95	100	100	110	120	
36 x 36	Thickness	14″	15″	15″	17″		
	Weight	100	105	105	115		

CONCRETE.

To ascertain Proportion of Voids in Concrete Aggregates.

Although the proportion of sand to coarse aggregate is usually specified, it may often be of importance to ascertain the approximately correct proportions needed, and the following method will be found easily applicable :—

Take an ordinary iron bucket, ascertain its exact weight empty, (call this W), fill it with water and weigh (call this W2). Then W2—W will be the capacity of the bucket as measured in water. Empty the bucket and fill it with the stone or sand to be tested for the percentage if voids, screed off evenly at top and weigh (call this W3), then pour in as much water as the bucket will take, then weigh and call it W4. W3 deducted from W4 will indicate the amount of voids in the stone or sand.

To Ascertain the Percentage.

$$\frac{(W4—W3) \times 100}{W2—W} \quad \frac{\text{space of voids} \times 100}{\text{total capacity}} = \text{per cent. voids.}$$

As stone will absorb water it must be fully saturated before using for above test.

ESTIMATED AVERAGE VOIDS IN A CUBIC YARD.

Or 27 cubic feet of broken metal, different kinds and gauges.

One cube yard	Gauge	c. ft. Voids.
Blue metal	2½in.	contains 10
Blue metal or clean sandstone ...	1½in.	,, 11⅓
Broken bricks, mixed	3in. to 1 in.	,, 13½
River shingle	3in. ,, ¾in.	,, 12
Screened sandstone	2in. ,, 1½in.	,, 9

Proportion of dry material required to make 1 cubic foot of well rammed concrete in position.

	4 to 1 mix. c. ft.	6 to 1 mix. c. ft.	8 to 1 mix. c. ft.
Stone	0.80	0.85	0.85
Sand	0.40	0.58	0.58
Cement	0.25	0.182	0.137

Stone or rich lime concrete shrinks from 20 to 23 per cent.

Cement concrete from 23 to 27 per cent. compared with the loose dry materials used, or the deduction in material thickness when compressed into place can be made on Table of Cubic Yard Covering Power.

Example of Cost, No. 1—Hand Labor only in mixing and casting concrete.

Arrangement of 6 men, viz., 4 shovel men, sprinkler, 1 ganger or trimmer. (Subject to variations).

Award wages—mixers, 2/1; packer, 2/1½; first grade men, 2/3; ganger in charge of 12 men, 2/6 per hour.

As the men work 8¾ hours per day the wages for above 6 men = 111/3 net labor only, per working day.

Average day's work of above gang, 20 c. yds.

Labor only, per cubic yard, 5/6.

	Per c. yd. s.	d.
The **net cost,** mixing and casting only, for 20 yards of broken brick or sandstone concrete, labor per c. yd.	5	6
The heavier bluestone metal is slower—15 c. yds. per day	7	6
Coke concrete being much lighter—25 c. yds. per day ...	4	3

Add for material plant, profit, &c.

Cement floating on rough surface of concrete.

And trowelling to a fair face in cement 1 to 2.

Material—One bushel of cement and two bushels of sand will cover 5 yds. ¾in. thick.

Labor—One man will float and finish 18 square yards per day, or about **two** yards per hour ¾in. thick. *See* Plasterer.

HAND LABOR ONLY—Concrete.		Per c. yd. s.	d.
Labor in gauging, mixing, wheeling, filling and ramming cement, screenings and metal concrete ...	6/– to	7	6
Forming or casing, per sq. yd....	9/– to	12	0
Plank runs and staging, add extra per sq. yd.	2/– to	6	4

Example, No. 2—Day's work for one man—Bluestone Concrete Floors, 6in. thick.

One man can mix, wheel 20 yds., spread concrete about 5 sq. yds., 6in. thick, in 8¾ hours.

	s.	d.
Net cost of **labor** under favourable circumstances 20/– = ...	4	0
Add **material,** bluestone, viz., one-sixth of c. yd. = (as per example, bluestone, preceding page), at £2/5/– = ...	7	6
Net cost per s. yd.	11	6

Labour.—Concrete mixed by **machine** costs approximately 5/– to 8/– per cubic yard.

Add materials, cement, 1in. bluestone, metal and sand, scaffolding, profit and incidentals, plants.

CONCRETE BUILDING BLOCKS.

Concrete block buildings can be reinforced very simply by inserting a few bars of iron or patent brick bonding.

Porch columns, concrete window caps, sills, steps, copings with different coloured quoins, arches and facings can be built as required with reinforced rods.

"Phoenix" Concrete Building Block Machine.

16 inch Block Machine, £52. With equipment, £80. 24 inch Block Machine, £100.

With vertical acting core, face of the block in bottom of machine mould, thus admitting of coarser concrete at back portion of block.

The system of *facing* with a mixture of 2 to 1 cement and finishing with a coarser material gives the block a finished surface where required, also waterproofing same to some degree.

CONCRETE BUILDING BLOCKS.

These can be made of coke or breeze siftings, or cinders as a body material to lighten the compressed mass in a 10 to 1 mix.

Example—	s.	d.
50 c. ft. = 2 loads of cinders at 7/–	14	0
20 c. ft. = 1 load of sand at 7/–	7	0
7 c. ft. = 7 paper bags cement at 5/–	35	0
80 c. ft.	56	0

80 cubic feet when compressed in moulds, the shrinkage (*see table covering power of concrete*) 4 to 3, the quantity would be 60 cubic feet solid, deducting **hollow cores** one third, which would make 150 blocks 8in. x 8in. x 16 inches long = 120 sq. ft. of face work.

(If all solid, the above material would make only 100 solid blocks of the above size.)

It would take 8 hours for two men mixing and casting 150 blocks.

	s.	d.
Labor, 16 hours at 2/6	40	0
Add **Material** to above	56	0
	96	0
Add for power, wear and tear, incidentals, 50 per cent ...	48	0
Making 120 super feet net	144	0

See Table for Labour Laying and Jointing.

For Quoins and Cottage Building.

Concrete Blocks or " Cinderete " for cottage homes.

1 x 1 x 6 mixture, one full size block will support 30 tons.

Blocks are hollow, various sizes, 20 x $9\frac{3}{4}$ x 4in. = 3 courses of brickwork.

1000 blocks will cover 160 s. yds, $14\frac{7}{8}$x$9\frac{3}{4}$x$9\frac{3}{4}$″ bed 4″ with $\frac{1}{4}$in. mortar joints, $4\frac{5}{8}$x$9\frac{3}{4}$x4″.

Largest size 158lbs. per square, 20x$4\frac{5}{8}$x$4\frac{1}{2}$″ bed.

Electric conduits may be passed through this hollow, $23\frac{7}{8}$x$4\frac{5}{8}$x4″, $9\frac{3}{4}$x$4\frac{5}{8}$x4″, $4\frac{5}{8}$x$4\frac{5}{8}$x4″, $1\frac{1}{2}$ courses.

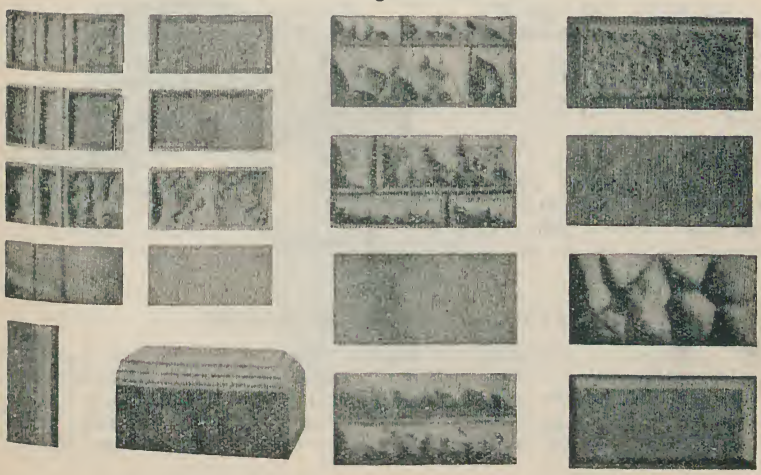
CEMENT BUILDING BLOCKS.

The cost of these ornamented faced structures varies considerably, according to the method used in construction.

The cost can be ascertained by measuring the dimensions of concrete block, deducting material of voids in the particular block, and reckoning various materials used, and labor—mixing and casting and drying, &c.

Only a few face patterns are illustrated. The makers supply about 50 or 60 different pattern blocks, the variety being chosen as required in construction.

Concrete Building Block Patterns.



CEMENT PRESSED BRICKS.

It may be to the advantage of a builder in suitable localities, where sand is easily procured, to make this kind of brick on the site.

Two men can make with a **9-brick machine** 4000 to 5000 bricks in 10 hours—one man mixing, and one man running the machine.

Ordinary tip-cart load of sand = 21 cubic feet.

1 bag of cement contains one c. foot.

The above would make $\frac{1}{8}$ *mixture of about* 6 *to* 1.

Estimated Cost of 5000 Cement bricks.

	£	s.	d.
10 loads sharp clean sand at 7/–	3	10	0
35 bags of cement at 5/–	8	15	0
2½ loads of coke siftings 6/–	0	15	0
Materials	13	0	0
Labour—2 men, 10 hours each = 20 hours at 2/6...	2	10	0
Wear and tear and water, (Approx.) ...	1	15	0
Net cost of 5000 bricks=	17	5	0

Cost about £3/9/– per 1000 on a 9 brick machine.

Extra handling in drying, wheeling, &c., to be added.

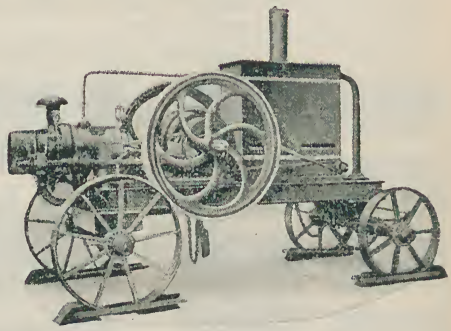
Cement 9-brick Machine. Price £95.

BLACKSTONE PORTABLE KEROSENE OIL ENGINE.

5½ H.P., 360 R.P.M., two fly wheels and standard pulley, mounted on W.I. wheels. Complete with horse shafts and tarpaulin, £250.

Price: 7 H.P. ditto, £275. 9 H.P., £295.

4 H.P. Bentall Petrol Kerosene Engine, 500 R.P.M. stationary. Price: £95/–/–. Approximate prices only).



CONCRETE MIXING MACHINERY.

There are many distinct kinds of concrete mixers and engines for driving same, combined and otherwise, suitable for all classes of work. The names and prices mentioned under are strictly for the *reference* and judgment of the contractor and are not intended for advertising any particular make. This is left to the agents and local

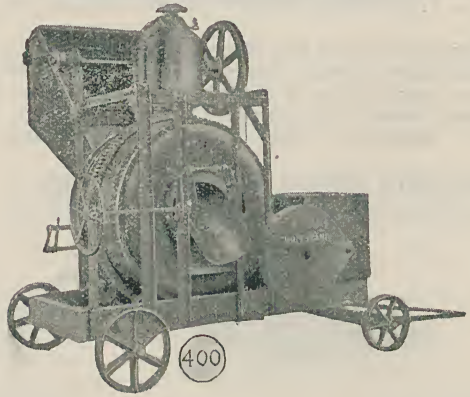
manufacturers, to whom I refer. They claim to save at least 10 per cent. in labor compared to hand mixing.

The conical tilting drum has proved one of the most serviceable types of concrete mixer for the general builder or contractor.

It gives a clean delivery into barrow (3½ c. ft.) underneath at each side at will for discharging into forms of construction.

The large mouth is to give speedy operation, and visible mixing, the entire bowl including the central bearing is one casting, ensuring perfect alignment, and minimising shocks from moving contents, also no corners to clog, and plows are self-cleaning ; an important item.

Petrol engine driven in steel cover on 2 or 4 wheels as desired.



CYLINDRICAL DRUM MIXERS.

Illustration shows motor driven model. Available in stationary or portable outfits with automatic measuring tank of special accurate pattern. On all " Britstand " Cylindrical Drum Mixers the dischager chute is entirely out of the drum during mixing.

TILTING DRUM MIXERS.

Sizes up to 60 C/F on application.

Illustration Page 145 shows small 3½ C/F Model. Equipped with Hand or Power Loader. Automatic Water Tank, Etc.

Conical Tilting Drum, capacity dry material, 7 c. ft. mixed concrete, per batch, 4 c. ft.

A 3½ cubic feet batch mixer or half bag size.

Approx. weight without charger, 1 cwt., price £120.

With elevating charging skip, £140.

A 3½ cub. feet batch mixing machine will mix 16 cub. ft. per day.

The above type of machinery is also made in 3 sizes, to take a bag of cement in a 4 : 2 : 1 mix. Weight 35 cwt., capacity 60 c. yds. per 8 hours.

Extra large model fitted with kerosene engine, 5 to 7 h.p. or electric motor, or belt drive power if desired. Capacity, 120 cub. yds. per day. Approx. weight 65 cwts., approx. price, £500.

The agents' names of above types are different, viz., "**Austral,**" "**Champion,**" "**Multimix,**" "**Rex,**" "**Age**" and "**Britstand.**"

CONCRETE MIXERS AND DISTRIBUTORS.

Suspended arm for road construction called the "Paver," £1,860.

The **Flumes** for mast or timber tower distributors of concrete cost, price per foot run, 25/–.

The continuous revolving batch drum mixer with reversible discharging chute.

An elevating charging hopper or skip from ground level, accessible roller chain drive around drum from counter shaft level with top of drum.

Control water tank with gauge glass for exact supply of water required to each batch.

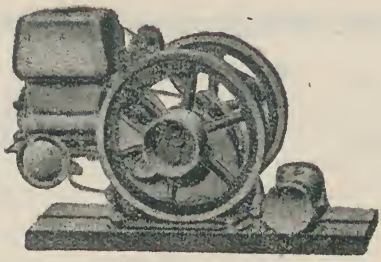
When the water tank is not required, the necessary piping with a 1in. quick opening gate valve, requiring a ¾in. hose connection.

A single cylinder gasoline or oil engine is required for a 4 c. ft. mixer.

A double cylinder 8 H.P. gasoline engine, fitted with high tension waterproofed magneto. Automobile type carburettor and fly ball governor for a 7 cub. ft. mixer of the larger machines.

Stationary or kerosene engine, 5 and 7 h.p., 4 cycle type, water cooled. The piston and connecting rod, etc., are enclosed in a steel housing.

3½ to 4 b.h.p. petrol engine with high tension rotary magnet, mounted on carriage. British make.



Approx. prices, Bentall's Petrol, 4 h.p., portable, £132.
Spring injection, Blackstone, kerosene, 5 h.p., £118, portable.
"Pioneer," 5 h.p., petrol, £73.

CERAMIC FACING FOR BUILDING

Introduced in Martin Place Govt. Savings Bank of N.S.W.

For the external facing of the huge premises for the N.S.W. Government Savings Bank, the architects (Messrs. Ross and Rowe) have employed specially shaped briquettes or "tesserae," with glossy glazed exposed faces of light mauve shade.

These briquettes measure 4in. square by 4in. maximum depth, and are shaped to form a key with the concrete at back; but are *flat-bedded* so that they can be built in layers like ordinary brickwork. The finished effect is, in a sense, a mosaic of small units, and this character is carried through the ornamental, as well as the plain surfaces.

See illustrated Methods of Fixing Facings in Brickwork and Concrete Sections.

Probably the cost is somewhat greater than sandstone, but the effect achieved is everlasting and untarnishable by weather or age.

Sizes vary in thickness from ¼in. facing per s. yard per square 100 feet, to 6in. facing, reckon by 1 foot square, 10/– to 15/– plain face.

Brick facing in 3in. courses, per 100 sq. feet. *see* Brickwork.

Further particulars in detail of cost not yet exactly known locally, can be obtained by reference to the manufacturers' advt., pp. 1 and 19.

In "faience" work, or modern facing of concrete and brick buildngs, the bricklayers have a new exacting employment between that of a wall tiler and their trade.

Compressed slabs (veneering of building, 18″x9″x¼″ tiles, price laying and bedding = 20/– per s. yd., to 12″x9″x¼″ tinted, mottled, glazed tiles, 23/– per s. yd.

THE ACTION OF CHEMICALS ON CONCRETE ONLY.

M. A. Stanley, C.E.

Name of Agent.	Formula.	How does it Attack Concrete.
Distilled Water	H_2O	Very Slowly.
Sea Water	NaCl $MgCl_2$, etc.	Very Slowly.
Caustic Soda	NaOH	Very Slowly.
Caustic Potash	KOH	Very Slowly.
Sulphuric Acid conc. 666 ...	H_2SO_4	Quickly Concrete moist.
Sulphuric Acid conc. 25% ...	H_2SO_4	Very quickly.
Sulphuric Acid conc. 10% ...	H_2SO_4	Very quickly.
Hydrochloric Acid conc. ...	HCl	Very quickly.
Nitric Acid conc.	HNO_3	Very quickly.
Nitric Acid conc. 10%	HNO_3	Very quickly.
Phosphoric Acid conc.	H_3PO_4	Quickly.
Phosphoric Acid conc. 10% ...	H_3PO_4	Quickly.
Oleic Acid	$O_{17}H_{33}$ CO_2H	Considerably.
Tannic Acid	$C_{14}H_1C_9$	Considerably.
Acetic Acid 10%	CH_3CO_2H	Quickly.
10% Tartaric Acid	$C_4H_6O_6$	Strongly.
10% Oxalic	$C_2H_2O_4$	Strongly.
10% Lactic Acid	$C_3H_6O_3$	Strongly.
Crenylic Acid 100%	C_7HgO	Little.
Picric Acid conc.	$C_6H_2(NO_2)_3CH$	Little.
Ammonium Sulphate 10% ...	$(N_4H)_2SO_4$	Considerably.

THE ACTION OF CHEMICALS ON CONCRETE ONLY. (*continued*)

Name of Agent.	Formula.	How does it Attack Concrete.
Ammonium Chloride 10% ...	NH_4Cl	Considerably.
Ammonium Nitrate 10% ...	NH_4NO_3	Considerably.
Common Salt	$NaCl$	Little.
Sodium Thicsulphate	$Na_2S_2O_3$	Little.
Sodium Acid Phosphate ...	NaH_2PO_3	Considerably.
Sodium Permanganate	$NaMnC_4$	Little.
Calcium Chloride	$CaCl_2$	Little.
Magnesium Chloride	$MgCl_2$	Little.
Magnesium Sulphate	$MgSO_4$	Considerably.
Barium Chloride	$BaCl_2$	Little.
Stannous Chloride (Tin Salt) ...	$SnCl_2$	Little.
Aluminium Chloride	$AlCl_3$	Strongly.
Ferro Chloride	$FeCl_3$	Strongly.
Mineral Oil...	Hydro-Carbon	Little.
Benzine	Hydro-Carbon	Little.
Kerosene	Hydro-Carbon	Considerably.
Coal Tar	Hydro-Carbon	Little.
Fats	Clyderide of Fatty Acids.	Strongly.
Turkey Red Oil	Sulphurated Castor Oil.	Strongly.
Soap Solutions	Alkali Salts of Fatty Acid	Considerably
Sugar	$C_{12}H_{22}O_{11}$	Little.

RODS FOR REINFORCING CONCRETE.

Diam. of Rods	PERIMETERS OF A NUMBER OF ROUND RODS. (*M. S. Stanley, A.M.I.E.A.*).									
	1 rod	2 rods	3 rods	4 rods	5 rods	6 rods	7 rods	8 rods	9 rods	10 rods
$\frac{1}{8}$	.3926	.7852	1.1778	1.5704	1.963	2.3556	2.7482	3.1408	3.5334	3.92
$\frac{3}{16}$	.589	1.178	1.767	2.356	2.945	3.534	4.123	4.712	5.301	5.896
$\frac{1}{4}$	.7854	1.5708	2.3562	3.1416	3.927	4.7124	5.4978	6.2832	7.0686	7.854
$\frac{5}{16}$	.9817	1.9634	2.9451	3.9268	4.9085	5.8902	6.8719	7.8536	8.8353	9.817
$\frac{3}{8}$	1.178	2.356	3.534	4.712	5.89	7.068	8.246	9.424	10.602	11.78
$\frac{7}{16}$	1.374	2.748	4.122	5.496	6.87	8.244	9.618	10.992	12.366	13.74
$\frac{1}{2}$	1.57	3.14	4.71	6.28	7.85	9.42	10.99	12.56	14.13	15.7
$\frac{9}{16}$	1.767	3.534	5.301	7.068	8.835	10.602	12.369	14.136	15.903	17.67
$\frac{5}{8}$	1.963	3.926	5.889	7.852	9.815	11.778	13.741	15.704	17.667	19.63
$\frac{11}{16}$	2.159	4.318	6.477	8.636	10.795	12.954	15.113	17.272	19.431	21.59
$\frac{3}{4}$	2.356	4.712	7.068	9.424	11.78	14.136	16.492	18.848	21.204	23.56
$\frac{13}{16}$	2.552	5.104	7.656	10.208	12.76	15.312	17.864	20.416	22.968	25.52
$\frac{7}{8}$	2.748	5.496	8.244	10.992	13.74	16.488	19.236	21.984	24.732	27.48
$\frac{15}{16}$	2.945	5.89	8.835	11.78	14.725	17.67	20.615	23.56	26.505	29.45
1	3.141	6.282	9.423	12.564	15,705	18.846	21.987	25.128	28.269	31.41
$1\frac{1}{16}$	3.3392	6.678	10.017	13.357	16.696	20.035	23.3744	26.7136	30.0528	33.392
$1\frac{1}{8}$	3.534	7.068	10.602	14.136	17.67	21.204	24.738	28.272	31.806	35.34
$1\frac{3}{16}$	3.7321	7.464	11.196	14.928	18.661	22.393	26.1347	29.8568	33.5889	37.321
$1\frac{1}{4}$	3.927	7.854	11.781	15.708	19.635	23.562	27.489	31.416	35.343	39.27
$1\frac{5}{16}$	4.125	8.25	12.375	16.5	20.625	24.75	28.875	33.	37.125	41.25
$1\frac{3}{8}$	4.319	8.638	12.957	17.276	21.695	25.914	30.233	34.552	38.871	43.19

The above table is read vertically and horizontally and gives the circumference of any number of rods from $\frac{1}{8}$in. to $1\frac{3}{8}$. Thus, ten 1in. rods have a total circumference or perimeter equal to 31.41 inches.

M. S. Stanley. A.M.I.E.A., Concrete Engineer.

Diam. in Inches	*CIRCULAR COLUMNS.*				*HEXAGON COLUMNS.*			
	Area in Square ins.	Perimeter in inches	Weight in pounds per lin. foot	Volume in cubic ft. per lineal ft.	Min. Dia in inches	Area in square ins.	Perimeter in inches	Weight in pounds per lin. foot	Volume in cubic ft. per lineal ft.
12	113.1	37.70	117.8	.78	12	119.3	39.76	124.3	.83
13	132.7	40.84	138.2	.92	13	140.0	43.08	145.8	.97
14	153.9	43.98	160.3	1.07	14	162.4	46.39	169.2	1.12
15	176.7	47.12	184.1	1.22	15	186.4	49.7	194.2	1.29
16	201.1	50.27	209.5	1.40	16	212.1	53.02	220.9	1.47
17	227.0	53.41	236.5	1.57	17	239.4	56.33	249.4	1.66
18	254.5	56.55	265.1	1.77	18	268.4	59.65	279.6	1.86
19	283.5	59.69	295.3	1.97	19	299.1	62.99	311.6	2.08
20	314.2	62.83	327.3	2.18	20	331.4	66.27	345.2	2.30
21	346.4	65.97	360.8	2.40	21	365.3	69.59	380.5	2.53
22	380.1	69.12	395.9	2.64	22	401.0	72.9	417.7	2.78
23	415.4	72.26	432.8	2.88	23	438.2	76.21	456.5	3.04
24	452.4	75.4	471.2	3.14	24	477.2	79.52	479.1	3.31
25	490.9	78.54	511.4	3.41	25	517.8	82.84	539.4	3.59
26	530.9	81.68	553.0	3.69	26	560.0	86.16	583.3	3.89
27	572.6	84.82	596.5	3.97	27	603.9	89.47	629.1	4.19
28	615.8	87.96	641.5	4.27	28	649.5	92.78	676.6	4.51
29	660.5	91.11	688.0	4.59	29	696.7	96.10	725.7	4.84
30	706.9	94.25	736.3	4.91	30	745.6	99.41	776.7	5.17
31	754.8	97.39	786.2	5.24	31	796.1	102.72	829.3	5.52
32	804.2	100.53	837.7	5.58	32	848.3	106.04	883.6	5.89
33	855.3	103.67	890.9	5.94	33	902.2	109.35	939.8	6.26
34	907.9	106.81	945.7	6.30	34	957.7	112.66	997.6	6.64
35	962.1	109.96	1002.2	6.68	35	1014.8	115.98	1057.1	7.04
36	1017.9	113.10	1060.3	7.06	36	1073.6	119.29	1118.3	7.45
37	1075.2	116.24	1120.0	7.47	37	1134.1	122.61	1181.3	7.87
38	1134.1	119.38	1181.3	7.87	38	1196.3	125.92	1246.1	8.30
39	1194.6	122.52	1244.4	8.29	39	1260.0	129.23	1312.5	8.74
40	1256.6	125.66	1308.9	8.72	40	1325.5	132.55	1380.7	9.20

Dia. of Rod.	Area of Steel per foot width of slab using Round Rods of varying pitches.																		
	Area	1½″	1¾″	2″	2¼″	2½″	2¾″	3″	3¼″	3½″	3¾″	4″	4¼″	4½″	4¾″	5″	5¼″	5½″	5¾″	6″
⅛	.01227	.098	.084	.074	.065	.059	.054	.049	.045	.042	.039	.037	.035	.033	.030	.030	.028	.026	.025	.024
3/16	.02761	.221	.189	.166	.147	.133	.121	.110	.102	.095	.088	.083	.078	.074	.070	.066	.063	.060	.058	.055
¼	.0491	.393	.337	.295	.212	.236	.214	.196	.181	.169	.157	.147	.139	.131	.124	.118	.112	.107	.103	.098
5/16	.0767	.614	.526	.460	.409	.368	.335	.307	.283	.263	.245	.23	.217	.205	.194	.184	.175	.167	.160	.153
⅜	.1104	.883	.757	.662	.589	.53	.481	.442	.408	.379	.353	.331	.312	.294	.279	.265	.252	.241	.231	.221
7/16	.1503	1.202	1.030	.902	.802	.721	.656	.601	.555	.515	.481	.451	.424	.401	.38	.361	.344	.328	.314	.301
½	.1963	1.570	1.332	1.178	1.047	.942	.857	.785	.725	.666	.628	.589	.554	.523	.496	.471	.444	.428	.410	.393
9/16	.2485	1.988	1.704	1.491	1.325	1.193	1.084	.994	.918	.852	.795	.746	.702	.663	.628	.596	.568	.542	.520	.497
⅝	.3067	2.454	2.103	1.84	1.636	1.472	1.338	1.227	1.132	1.052	.981	.920	.866	.818	.773	.736	.701	.669	.641	.613
¾″								1.485	1.371	1.273	1.188	1.110	1.042	.990	.925	.891	.849	.809	.776	.742
⅞″								1.767	1.631	1.514	1.413	1.325	1.247	1.178	1.12	1.060	1.009	.964	.924	.883
1″												1.555	1.464	1.832	1.31	1.244	1.185	1.13	1.083	1.037
1⅛″												1.804	1.698	1.603	1.52	1.443	1.374	1.312	1.257	1.203

DATA FOR STEEL REINFORCEMENTS.

Dia. of Rods.	Weight in Pounds of Round Mild Steel Rods.														
	1′	2′	3′	4′	5′	6′	7′	8′	9′	10′	11′	12′	13′	14′	15′
⅛	.041	.082	.123	.164	.205	.246	.287	.328	.369	.41	.451	.492	.533	.574	6.15
3/16	.094	.188	.282	.376	.47	.654	.658	.752	.846	.94	.1034	1.128	1.222	1.316	1.41
¼	.167	.334	.501	.668	.835	1.002	1.169	1.336	1.503	1.67	1.837	2.004	2.171	2.338	2.505
5/16	.261	.522	.783	1.044	1.305	1.566	1.827	2.088	2.349	2.61	2.871	3.132	3.393	3.654	3.915
⅜	.376	.752	1.128	1.504	1.88	2.256	2.632	3.008	3.384	3.76	4.136	4.512	4.888	5.264	5.64
7/16	.511	1.022	1.533	2.044	2.555	3.066	3.577	4.088	4.599	5.11	5.621	6.132	6.643	7.154	7.665
½	.668	1.336	2.004	2.672	3.34	4.008	4.676	5.344	6.012	6.68	7.348	8.016	8.684	9.352	10.02
9/16	.845	1.69	2.535	3.38	4.225	5.07	5.915	6.76	7.605	8.45	9.295	10.14	10.985	11.83	12.675
⅝	1.044	2.088	3.132	4.176	5.22	6.264	7.308	8.352	9.396	10.44	11.484	12.528	13.572	14.616	15.66
11/16	1.263	2.526	3.789	5.052	6.315	7.578	8.841	10.104	11.367	12.63	13.893	15.156	16.319	17.582	18.845
¾	1.503	3.006	4.509	6.012	7.515	9.018	10.521	12.024	13.527	15.03	16.533	18.036	19.539	21.042	22.545
13/16	1.764	3.528	5.292	7.056	8.82	10.584	12.348	14.112	15.876	17.64	19.404	21.168	22.932	24.696	26.46
⅞	2.046	4.092	6.138	8.184	10.23	12.276	14.322	16.368	18.114	20.46	22.506	24.552	26.598	28.644	30.69
15/16	2.349	4.698	7.047	9.396	11.745	14.094	16.443	18.792	21.141	23.49	25.839	28.188	30.537	32.886	35.235
1″	2.673	5.346	8.019	10.692	13.365	16.038	18.711	21.384	24.057	26.73	29.403	32.076	34.749	37.422	40.095
1⅛	3.382	6.764	10.146	13.528	16.81	20.292	23.674	27.056	30.438	33.82	37.202	40.584	43.966	47.348	50.73
1¼	4.176	8.352	12.528	16.704	20.88	25.056	29.232	33.408	37.584	41.76	45.936	50.112	54.288	58.464	62.64
1⅜	5.053	10.106	15.159	20.212	25.265	30.318	35.371	40.424	45.477	50.53	55.583	60.636	65.689	70.742	75.795
1½	6.013	12.026	18.039	24.052	30.065	36.078	42.091	48.104	54.117	60.13	66.143	72.156	78.169	84.182	90.195

Diam. of Rods.	AREAS IN SQUARE INCHES OF A NUMBER OF ROUND RODS. Number of Rods.										
	1′0″	1	2	3	4	5	6	7	8	9	10
$\frac{1}{8}$	.041	.01227	.02454	.03681	.04908	.06135	.07362	.08559	.09816	.11043	.1227
$\frac{3}{16}$	.094	.02761	.05522	.08283	.11044	.13805	.16566	.19321	.22088	.24849	.2761
$\frac{1}{4}$	.167	.04908	.09816	.14724	.19632	.24540	.29448	.34356	.39264	.44172	.4908
$\frac{5}{16}$	.261	.07669	.15338	.23007	.30696	.38345	.46014	.53683	.61352	.69021	.7669
$\frac{3}{8}$	.376	.1104	.2208	.3312	.4416	.5520	.6624	.7728	.8832	.9936	1.104
$\frac{7}{16}$	.511	.1503	.3006	.4509	.6012	.7515	.9018	1.0521	1.2024	1.3527	1.503
$\frac{1}{2}$	.668	.1963	.3926	.5889	.7852	.9815	1.1778	1.3741	1.5704	1.7667	1.963
$\frac{9}{16}$	.845	.2485	.4970	.7455	.9940	1.2425	1.4901	1.7395	1.988	2.2365	2.485
$\frac{5}{8}$	1.044	.3067	.6134	.9201	1.2268	1.5335	1.8402	2.1469	2.4536	2.7603	3.067
$\frac{11}{16}$	1.263	.3712	.7424	1.1136	1.4848	1.8560	2.2272	2.5984	2.9696	3.3408	3.712
$\frac{3}{4}$	1.503	.4417	.8834	1.3251	1.7668	2.2085	2.6502	3.0919	3.5336	3.9753	4.417
$\frac{13}{16}$	1.764	.5184	1.0368	1.5552	2.0736	2.592	3.1104	3.6288	4.1472	4.6656	5.184
$\frac{7}{8}$	2.046	.6013	1.2026	1.8039	2.4052	3.0065	3.6078	4.209	4.8104	5.4117	6.013
$\frac{15}{16}$	2.349	.6902	1.3804	2.0706	2.7608	3.4510	4.1412	4.8314	5.5216	6.2118	6.902
1	2.673	.7854	1.5708	2.3562	3.1416	3.9270	4.7124	5.4978	6.2832	7.0686	7.854
$1\frac{1}{8}$	3.382	.9940	1.9880	2.982	3.976	4.97	5.964	6.958	7.952	8.946	9.940
$1\frac{1}{4}$	4.176	1.227	2.454	3.681	4.908	6.135	7.362	8.589	9.816	11.043	12.27
$1\frac{3}{8}$	5.053	1.484	2.968	4.452	5.936	7.420	8.904	10.388	11.872	13.356	14.84
$1\frac{1}{2}$	6.013	1.767	3.534	5.301	7.068	8.835	10.602	12.369	14.136	15.903	17.67

The parallel stirruped web girder system of reinforcements for concrete floors forming arched channels between about 2 feet wide running from wall to wall, thus eliminating the dead weight from the heavy slab type.

The moulding forms are made of curved gal. iron sheets.

See David Jones' Warehouse, near St. James Underground Ry. Station.

The B.R.C. Co. Ltd., Manchester, have introduced a permanent flat bottom moulded breeze tubing between, as a moulding form, setting on ledge of concrete web girder and level with ceiling line of girder.

RAWLPLUG BOLT ANCHOR.

A Device made for Securing Bolts to Concrete.

THE RAWLPLUG BOLT ANCHOR is a truncated cone of chilled iron attached to a short cylinder of lead made in sizes to fit bolts from ⅜ inch to 1¼ inch dia. This iron cone is divided into segments at the inserted end which are fractured by the action of caulking, and **expand,** forcing the cutting edges into the wall of the hole bored and so wedging the lead firmly against the **bolt head** and shaft or barrel of bolt and the walls of the hole.

The space left round the **bolt** is filled with Portland cement to minimise **side strains** and to consolidate the material.

Fitments can be immediately bolted up under great stress. In good concrete for small bolt sizes, a depth of hole about 4 inches is sufficient ; for larger bolts, 6 to 9 inches deep.

To facilitate caulking effectively, the lead cylinder of the larger size **bolt anchor** is made in two sections. For excessively strong fixing, **two anchors** should be used instead of **one,** being thoroughly " caulked," one at a time. For overhead fixing, they bear excellent results.

Extract from " The Sun," Sydney, Nov. 29th, 1926.

Amongst others, the N.S.W. Government Railways have availed themselves of the obvious advantages of this device, and Rawlplug Bolt Anchors are now being extensively used in the construction of the city railway.

Size of Bolt dia.	⅜in.	½in.	⅝in.	¾in.	1in.	1¼in.
Anchors for Bolts Price per doz. ...	12/-	18/-	24/-	36/-	56/-	72/-
Dia. of Drilling Tool required	⅞in.	1⅛in.	1¼in.	1⅝in.	2in.	2½in.

Price of Boring Tools, 7/8″, 7/6″, 1⅛″ 10/6 each. Caulking Tools, 7/6 ea. upwards.

Electric or Pneumatic Power Drill should be used.

For Further information, see Advt., p. 4.

A series of tests has recently been carried out by R. H. Stranger, A.M.I.C.E., in London, also P. H. Russell, University of Sydney.

Mr. Stranger reports 28 tests to destruction, and that in 13 cases the bolt broke, and in four others the block split. These tests were with a Buckton horizontal testing machine by a direct pull to the ultimate resistance of the anchors, when fixed in holes in reinforced concrete and granite blocks.

COMPRESSED AIR

ITS APPLICATION AND PERFORMANCE.

The following list contains possible applications of compressed air that have been **suggested by the makers to the Builder or Contractor** of various works for his consideration **and use.**

In **agitating Asphalt,** or any liquid except molten metal, **Scaling Asphalt** Tanks or Vats.

BOILER SHOPS. Running Chipper, Riveting and Caulking Hammers.—Operating Drills, Reamers, Flue Expanders, Punchers, &c.—**Blowing Rivet Forges—Supplying Hoists, Lifts and Jacks**—Cleaning Boiler Flues—**Removing Scale, Rust and Paint by the Sand Blast.**

AIR COMPRESSORS.

Consolidated Pneumatic Tool Co. (English Make).

PORTABLE PETROL DRIVEN AIR COMPRESSORS.

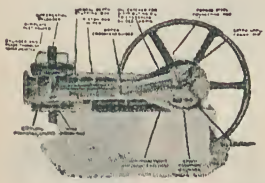
(100 and 360 cub. feet sizes).

Approx. **H.P.** at 100 lbs. air pressure,
five sizes, 5¼in. dia. cylinder 18
to 8¼in. dia. cylinder 55
£585 to £1350.

Mounted on steel wheels, or flanged wheels for rails. Solid rubber tyres, or trailer with springs, on roller bearing and on skids, 18 H.P. only on Ford truck.

USED BY BRIDGE BUILDERS. Operating Chipping and Riveting Hammers, Drills, Punchers, &c.—Blowing Rivet Forges—Pneumatic Paint Spraying System.

STATIONARY AIR COMPRESSORS.



All powers weight
From 6in. dia. cylinder 200 lbs.
5ft. 4in. x 2ft. 2in. floor space wide
to 20in. dia. cylinder 1400 lbs.
12ft. x 5½ft. floor space wide.

Prices range from
£200 to £1000.

Regulated by **Auto Pneumatic Throttle,** in conjunction with engine governor, and a differential unloader on the compressor.

USED IN CONTRACT WORK. Rock Drills, **Hammer Drills and Stone Channellers,** Operating Pneumatic Hammers, Drills and Reamers —Sheet Pile Drivers—Drill Sharpeners—Blowing Smith Fires—Submarine Drills—Steam Shovels—Operating Direct-Acting Pumps —Pick and Drill Sharpeners—Cleaning Boiler Flues—Pneumatic

Tools for the Repair Shop—**Pile Drivers for Shaft Sinking**—Air Lift Pump for Water Supply of Mine Unwatering.

USED IN CUT STONE AND MONUMENTAL YARDS. Running Stone Tools, Polishers, &c—Cleaning Carvings with the Air Jet.

LITTLE GIANT MIDGET DRILLS (for Revolving Bits).

All sizes ¼in. drilling to 2in., for metal, wood, tile, brick, or concrete and plaster. Length 13½in. to 14¼in. Weight, 8 lbs., using approx. 14 cub. feet air per minute. ¼in.=10A, ⅜in.=10B, ½in. drilling capacity with regulating trigger or handle.

Price, from £19 to £58.

Speed, approx. free, 1300 revolutions to 2950 revolutions per minute, free.

For Further information, see Advt., p. 4.

USED IN QUARRIES. Rock Drills, Hammer Drills—Stone Channellers—Hoists, Lifts and Motors—Operating Direct-Acting Pumps. Clearing out clay beds between stone.

PNEUMATIC TOOLS, ROCK DRILLS, BORERS and HAMMERS.

Sinker Rock Drills (*dry and wet*), one man **self-rotating hand hammer** drilling holes in rock, concrete. In several sizes and weights. 55lbs., from £13/10/–. No. 5 plug and feather to £82/10/–.

Will operate with air up to about 30ft.

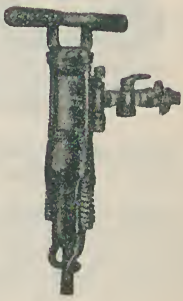
Strong blowing device clears the cuttings from bottom of holes.

A one inch hollow hexagon steel cutting tool is generally employed, also special rolled spiral shank tools for clearance of debris through which the compressed air is forced, at about 80lbs. pressure and upwards (or water is used on sticky grounds).

USES IN SAW MILLS. Operating Edgers, Bumpers, Pick-Ups, &c.

AUGER ROCK DRILL.

Similar to Sinker Drill.



(Rotary). With auger steel. Suitable for drilling in sticky formations, soft iron ore, anthracite, gypsum, slate, shale, talc, N.Z. Oamaru freestone, limestone, marbles, kaolin, or asbestos. Price, from £12 to £50.

AIR COMPRESSOR USES IN STRUCTURAL WORKS. Pneumatic Tools for Drilling, Chipping, Riveting and Caulking—Air Hoists—Pneumatic Punches—Rock Drills and Plug Drills—Drainage Pumps. Driving out stagnant air in cellars.

A compressed air drill with 1½in. dia. bit.

can sink	3	feet in	5	minutes		in fine yellow sandstone, the
,, ,,	6	,, ,,	8	,,		first foot is generally dry
,, ,,	8	,, ,,	10	,,		and harder near the surface
,, ,,	9	,, ,,	12	,,		but averages about 18 inches
,, ,,	10	,, ,,	15	,,		per minute.

Note.—With a 1¼ in. drill bit the times would be 25 per cent. quicker.

Pneumatic hammer, for riveting from 1½in. and under, length 14¾in. weight 16lbs., 1500 blows per minute, with regulating trigger to handle; £16 to 1½in. and up, length 15¾in., weight 17¾lbs., 1400 blows per minute, £20.

STONE OR METAL CHIPPING OR CAULKING HAMMERS.

Various sizes, from £14/–/– upwards.

Stone Dressing Hammers.

5 sizes, from 9/16in. to 1¼in., and U valves.

Prices from £4/10/– to £15.

OTHER USES FOR COMPRESSED AIR MACHINE.

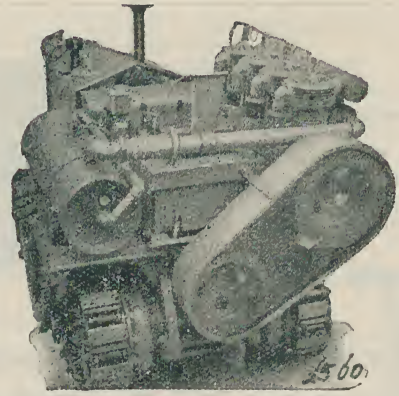
MINING. Running Rock Drills and Hammer Drills—Acting Pumps—Drill Steel Sharpeners—Blowing Smith Fires. General ventilation of confined spaces.

MUNICIPALITIES AND PUBLIC INSTITUTIONS. Pumping Water—Testing and Caulking Pipe Lines—Rock Drills in Road Construction—**Blowing Fire Whistles**—Filtration Plants, and many other uses all mentioned previously.

FRACTIONS AND THEIR DECIMAL EQUIVALENTS.

1/64	0.0156	17/64	0.2656	33/64	0.5136	49/64	0.7656
1/32	0.03125	9/32	0.28125	17/32	0.53125	25/32	0.78125
3/64	0.0468	19/64	0.2968	35/64	0.5468	51/64	0.7968
1/16	0.625	5/16	0.3125	9/16	0.5625	13/16	0.8125
5/64	0.0781	21/64	0.3281	37/64	0.5781	53/64	0.8281
3/32	0.09375	11/32	0.34375	19/32	0.59375	27/32	0.84375
7/64	0.1093	23/64	0.3593	39/64	0.6093	55/64	0.8593
1/8	0.125	3/8	0.375	5/8	0.625	7/8	0.875
9/64	0.1406	25/64	0.3906	41/64	0.6406	57/64	0.8906
5/32	0.15625	13/32	0.40625	21/32	0.65625	29/32	0.90625
11/64	0.1718	27/64	0.4218	43/64	0.6718	59/64	0.9218
3/16	0.1875	7/16	0.4375	11/16	0.6875	15/16	0.9375
13/64	0.2031	29/64	0.4531	45/64	0.7031	61/64	0.9531
7/32	0.21875	15/32	0.46875	23/32	0.71875	31/32	0.96875
15/64	0.2343	31/62	0.4843	47/64	0.7343	63/64	0.9843
1/4	0.25	1/2	0.5	3/4	0.75	1	1.0

Direct-mounted Air Cooled Compressor on Crawler Mounting.



Approximately £420 to £600 for equipment.
From 2, 3, 4 cylinders.

Weight 375 lbs. 550 lbs. 725 to 1200 lbs.

Air delivery and details &c. refer to British Standard Machinery Co., 65 York St.

Light weight, no water jackets, cooling water radiator &c. Full volume of air is assured.

CONSTANTS OF LABOR IN COSTING

TABLE OF ROUGH AVERAGE DAY LABOR.

Being the **average** time taken to execute work in the different trades ; compiled with great care from the work actually done by the Public Service of N.S.W.

The following tables, though not perfect, may be found useful for estimating the cost of labour only.

The approximate number of hours taken by the average skilled artisan can be ascertained for different kinds of work, using the constant of one hour and fractions of an hour as a multiplying factor.

It is impossible to lay down fixed rules under different conditions for every item in the different trades because they vary in very nearly every job. Plumbing work, being so varied, it is omitted from this schedule of proportions. The absolute correct valuing of quantities requires experience and practical knowledge and tenders differ accordingly.

METHOD REQUIRED TO USE THE TABLE.

Multiply the amount of existing wages or rate per hour of workmen for different trades by the number and decimal in the constant table to **find the price of labour** only.

To this, add the cost of material for each trade and the total will give the approximate estimated **nett cost** of the work without incidentals such as Waste of Material, Clerical Work, Cartage or Transport, Profit, etc.

> The great value of this table is that **Wages** as they alter by circumstances, and localities, for the labour of tradesmen and otherwise, can be multiplied by these constants to suit each difference of each rise or fall of the current wage, and to find the cost of **labour** of the above mentioned items of work at all times. I have therefore omitted to give the detail cost of labour to work in **each section** of building trade as in previous editions.—C. E. Mayes.

No. 1 EXAMPLES OF WORKING TABLE.

EXCAVATOR. CONSTANT

	Pence
Average excavating, labourer's wage, per hour 2/6, say	30
multiplied by one, decimal four. *See Earth*	1.4
	120
	30
Answer=3/6, = pence 12)	42.0
Add for incidentals, barrows, planking, tools and wear and tear and profit	1/6
Total per cub. yard	5/–

No. 2 EXAMPLE OF WORKING TABLE OF BRICKWORK.

BRICKLAYER.

	Tradesman and Labourer. Pence
Bricklayers' wages, 3/– per hour ...	36.00
Bricklayers' labourer, 2/7¼ per hour	31.25
Added together ...	67.25
Multiply by constant	45
	33625
	26900
	12)3026.25
	20)252.18
Labour only =	£12 12 3
Add materials, 3,672 bricks at 75/–	13 15 9
4 bags lime at 8/6 ...	1 14 0
4 loads sand, 7/– ...	1 8 0
	£29 10 0
Add 10% for profit ...	2 19 0
Present average contract price, Total per rod	£32 9 0

Constants of Labor in Hours and Decimals

EXCAVATOR.	Labour Hours.
EXCAVATION ONLY, per cub. yard.	
Earth or loam	0.5
Clay or heavy ground	1.0
Gravel or hard ground	1.5
Digging, Throwing into Barrows and Wheeling, 50 yards.	
Earth	1.4

(per cub. yard),	Hours.
Gravel, clay, etc.	1.8
Filling in and Ramming	0.5
Clay Puddling.	
Tempering and laying 9in. thick ...	6.50
Ditto, in layers 12in. thick	5.50
Concrete.	
Mixing, wheeling, depositing and ramming	2.30
Mixing, wheeling, spreading and levelling, 9in. thick, at per yard super	0.80
Ditto, 12in. thick	1.10
Ditto, 18in. thick	2.00

BRICKWORK.	Bricklayer & Labourer Hours.
Brickwork, per rod	45.00
9in. walls	51.32
Extra Labour.	
selected facings, per ft. sup.	51.2
Axed arches	.35
Gauged arches	.80
4½in. Brick walls.	
In cement	.15
Tuck-pointing, per yard super	2.50
Bricknogging, laid flat per yd. sup. ...	.68
Bricknogging, on edge	.66
Brick paving, laid flat in sand	.43
Ditto, on edge in sand	.65
Ditto, laid flat in mortar	.70
Ditto, on edge in mortar	.86

Constants of Labor in Hours and Decimals

DRAINER.

	hours
4in. G.E. pipe laid, cement joints, including junctions, per foot run	.11
6in. Ditto	.16
9in. Ditto	.24
12in. Ditto	.31
18in. Ditto	.50
T.C. Lumber or "Konka" breeze blocks, per square, 10ft. x 10ft, viz.	4.00
Pantiling, laid dry, per sq.	4.00
Ditto, pointed outside ditto	6.40
Ditto, pointed both sides ditto	8.80
Plain Tiling, laid to a 4in. gauge, per sq.	7.00
Ditto, 3½in. ditto	7.20
Ditto, 3in. ditto	7.40

MASON.

	Hours.
Labour on Sydney Sandstone, per ft. sup.	
Sawing	.60
Plain work in beds and joints ...	1.25
Sunk work	1.20
Plain faced, rubbed	1.25
Ditto, circular	1.55
Sunk work, rubbed	1.63
Ditto, circular	1.75
Moulded work	2.00
Ditto, circular	3.00
Circular work to shafts of columns ...	3.00
Circular circular work	4.70

SLATER.

(**For Number of Slates to the Square,** *see Roof Section*).

	Slater and Labourer Hours.
Preparing and laying	
Doubles, 10 x 6	3.90
Ladies, 16 x 8	2.60
Countesses, 20 x 10	1.90
Duchess, 24 x 12	1.55
Rendering Joints of Slating, per sup. yd.	.50

CARPENTER AND JOINER.

	Hours.
Oregon Pine, in trusses, per cub. ft. ...	1.35
Hand planing Pine, per ft. super	.13
Centering, per square.	Per square
For plain cylindrical arches	15.50
For groined arches	32.00
For trimmer arches, per ft. sup. ...	.55

Constants of Labor in Hours and Decimals

ROUGH BOARDING, per square.

Thickness	Rough hours.	Jointed hours.
¾in.	... 2.20	3.00
1in.	... 2.38	3.18
1¼in.	... 2.62	3.42
1½in.	... 2.90	3.70

Clear Oregon Pine.

	Hours.
Battening, per square (incl. plugging to wall)	
¾in. to 1¼in. placed 12in. apart ...	2.59
H.W. Weather Boarding, per square ...	4.20
Gutter Boards and Bearers, per sq. ft.	
1 to 1¼in.	.24
Md. Skirtings (including plugging), fixed, per ft. sup.	
¾in. square	.35
1in. square	.40
1¼in. square	.75
Framed Grounds, per super ft.	
¾in. grounds	.55
1in.	.60
1¼in.	.65
1½in.	.74
Pine framed Partitions, per ft. super, hand labour.	
1½in. square framed	.50
1½in. moulded, one side	.60
Ditto, both sides	.70
2in. square framed	.50
Moulded, one side	.62
Ditto, both sides	.74
Window Linings, per ft. super.	
Inch Pine, two-panel square framed back linings	.95
Ditto, bead-butt or moulded	1.07
Ditto, bead flush or quirk moulded ...	1.13
Additional panels, each	.18
If moulded, add...	.24
For splayed linings, add	.07
Framed Doors, 4 panels.	
If squared framed, 1¼in.	.70
Ditto, 1½in.	.77
Ditto, 2in.	.89
Ditto, 2½in.	1.02
Door Jam Linings, per ft. sup.	Hours.
1¼in. single rebated	.30
Ditto Double Ditto	.38
1½in. 3 or 4 panel	.131
2in. dou. rebated	.48
3 or 4 panels	1.37

Constants of Labor in Hours and Decimals

PINE STAIRCASES, PER SUPER FOOT.
(Including fixing on carriages and brackets).
GRADES OF STRINGS, TREADS AND RISERS.

	Thickness of Treads.			
	1in.	1¼in.	1½in.	2in.
	Hours			
Rough, with edges shot	.29	.33	.37	.45
Wgt., with rounded nosings	.54	.60	.66	.78
Wgt., glued, and blkd., with rounded nosings	.61	.68	.75	.88
Ditto, if moulded	.70	.78	.85	.98
Add—If risers be tongued into the treads on one edge	.06	.07	.08	.09

STAIR-STRINGS.

	To 1¼	To 1½	To 2
	Hours		
Add—If sunk	.25	.27	.30
If moulded	.13	.14	.15
If cut for steps and risers	.21	.22	.24
If cut for steps and risers and mitred ...	.60	.63	.66

Wreathed or circular strings are to be taken as 4 times the rate of straight.

Joinery Oregon Pine Wall Strings, to per foot super.	Hours.
Plain and plugged, 1¼in.	.50
Ditto, 1½in.	.55
Ditto, 2in.	.68
If moulded, add	.12

Oregon Pine Handrails, per foot run	
Plain, 3in. x 3in.	.50
Moulded ... ... from	.75
Add for ramps ... ... from	.42

Labour to mahogany, maple or cedar handrails, 1½ times that of Pine.

Plain Square Balusters, nailed in, per foot run.	Hours.
1in. x 1in.	.17
1¼in. x 1¼in.	.19
Dovetailed, extra per foot run	.08
Dovetails, in steps, each baluster	.25
Iron balusters, fixing	.5

Constants of Labor in Hours and Decimals

Dados, per foot super.

	hrs.
Framed Dado, with dovetailed keys, joints secured with slips, etc., etc.	.70
Add—If raking, scribed to steps	.19
If to moulded nosings	.20
If base grooved into floor	.09
If circular on plan, twice the straight.	

Boxed Pilasters or Newels, per foot super.

1½in. deal plain pilasters, glued and blocked	.94
1½in. deal diminished newels, columns, glued and blocked	4.00

Add for **fluting,** single, .20 hours, double, .25 hours, treble, .40 hours

PLASTERER.

Tradesman, Labourer and Apprentice.

	Hours.
Rendering per yard super	.18
,, curved	.23
,, and setting with fine stuff	.32
,, and setting curved	.37
,, floating and setting	.42
,, floating and setting curved	.52
Lathing	.18
,, curved	.25
Rendering with cement and sand	.40

PAVINGS.

Laid Complete, per sq. yard.

Bluestone Cement Concrete, 6in. thick, foundations	from 15/–
Tarred Blue Metal Screening, 1in. thick	from 3/6
Asphalte Fillet, 3 x 1, around basements or walls, per lineal yard	1/–

TARRED PAVEMENTS.

Bluestone Metal, 3in. thick, composed of 1¼ gauge metal, with 1in. top dressing of ⅜″ screenings, and 20 per cent. dust, mixed in the proportion of 30 gallons of tar to 1 cubic yard screenings, rolled and sanded, per square yard ... from 6/–

DAMPCOURSES

FOR 9 inch WALL OF VARIOUS MATERIALS, COMPARATIVE.

	per roll.	per ft. net.	Fixed complete.
Malthoid for 9in. walls, 72ft.	15/–	= –/2½	–/3
Tar and Sand, at –/6 per gallon, ¾in. thick ...			–/10

Slates and Cement, double row, 20in. x 10in. at £10 per 1000 = 833 ft., about –/3 per foot run.
For 9in. wall Slates = –/3, cement and labour and waste, –/9 = 1/–.
Asbestos Dampcourse 72 feet long rolls

Width	4½″	9″	13½″	18″
Prices	6/–	11/6	17/–	22/9

Width	4½″	9″	13½″	
Adamax, in rolls of 72ft.	7/6	15/–	20/–	per Roll
Asphaltum, in rolls of 20ft. Trinidad	3/–	6/–	9/–	,,
Anderson's Rok Bitumen, in rolls of 24ft.	7/–	12/–	18/–	,,
Maltha and Ormonoid Sentinel 3 ply	5/–	9/9	14/6	,,
Rexilite, 2 ply, in rolls of 72ft. ...	7/6	15/7	23/–	,,
Rexilite, 3 ply in rolls of 72 ft. ...	8/–	16/–	24/–	,,
Ormo Ledcore, 1lb. lead	5/–	10/–	15/–	,,
Crane Brand, 2lb. lead, in 20ft. rolls	5/–	10/–		,,

Slates and Cement, horizontal, dou, row per sq. ft. 1/–
Ditto, vertically laid 1/9
Glazed earthen ware, 1¾in. thick
4½in. Walls, 9d.; 9in. walls, 1/3; 13in. walls, 2/–; 18in. walls, 3/–.
Danks pure lead Dampcourse, in rolls of 20 feet lengths.

	4″	9″	14″	18″ widths
2 Pound	5/–	10/–	15/6	20/– Roll
3 ,, ...	7/6	15/–	23/3	30/– ,,
4 ,, ...	10/–	20/–	31/–	40/– ,,

All lead products subject to market fluctuations.

RUBEROID AND MALTHOID DAMPCOURSE.

In Rolls for Floors or Covering.

Material only, laying and waste, per roll, 2/– extra to be added.

Width in inches	4½in.	9in.	13½in.	18in.	23in.	27½in.	36in.
Price per roll 72ft.	7/6	15/–	29/6	23/–	33/–	40/–	52/–.

Jointing and Coating Paint for Roofs: 6/– per gal.; red, 8/–, covering per gal. 200 sqaure feet to 250 square feet.

"Pudlo" Water Proofing Powder. Mix with Cement, then add Sand. If for Concrete Plaster work, 3lbs. to 1 bag cement for protection weather, 5lbs. to 1 bag cement for dampcourses, 6lbs. to 1 bag cement for damp basements, tanks, &c. Finish with steel trowel. 2/6 pound.

P & B Asbestos Dampcourse in rolls of 72 feet.
4½in., 6/–; 9in., 11/6; 13½in., 17/–; 18in., 22/9.

WATERPROOF FELTS AND SOUND DEADENING FELTS.

	Per Roll.
P. & B. Asphalt Saturated Felt.	
No. 45, containing 324 sq. ft. 3 feet wide	19/–
No. 50, containing 500 sq. ft. ,, ,, ...	19/6
Bituminous Hair Felt ,, ,, ...	70/–
Trinidad Roofing Felt, 66 p.c. Bitumen, 34 p.c. course fibric felt.	

Fix Deadening Felt on top of joists under floor boards.

Water proofing compounds, anti-corrosive, and special paints and materials, sanitary cement filler, R. & W., 1 gal. will cover 22 square yards first coat, and paint for concrete surfaces in 12 colours, from yellow to brown red.

"Hydro-seal," a thick bitumnious compound for toweling on surface of walls; useful in stopping leaks in all kinds of gutters, roofs, tanks, etc., repairing flashings, cracks in **Cement, Brickwork or Stonework.** 1 gal. will cover 35 to 40 square feet. Black, 10 pound tins, 8/6, white, 14 pound tins, 17/– per tin.

It is very elastic as it dries on surface in 24 hours and stays soft underneath.

S. & K. fibre reinforced waterproof **sound deadening** felt all widths up to 5 feet from 12/6, 16/6 per 100 s. ft.

Ormonoid Roofing Felt, for waterproof covering roofs and walls, masonry &c., from dampness. 1 ply 26/6 per roll of 64 lbs; 2 ply, 32/–; 3 ply, 38/– per roll of 72 ft. x 3 feet wide, covering capacity, 200 sq. ft. Capacity with a 2in. lap = 200 s. ft.

Ormonoid building paper, 24/6 per roll.

"Oral" "Sarking" felt is a high grade Asphalt Saturated felt 60 lbs. per roll. For further information, *see advt., p.* 20.

"Fabco Floatoid." For old roof. Same as Hydroseal, only thinner. A heavy paint. 1 gal will cover 100 sq. ft. on smooth surface.

	per gal.	5 gal. drums.
Black	8/–	43/9
White	12/3	61/3

1 gal. covering capacity on iron = 15 sq. yds. Malthoid = 13. In 4 gal. tins or 5 gallon steel drums.

Black, 13/6 per gal. White, 17/6 per gal.

"Super Cote," a semi liquid waterproofing material, composed of Gilsonite, from which is derived pitch, long asbestos fibre, non-volatile oils, and various gums. (For covering concrete, malthoid, iron or composition roofs).

Rok cold cement paint, for roofing or cement flooring. 1 gal. will cover 24 sq. yds. Price 12/–.

Rok hard (to be milled before use). Mastic. 1 gal. covers 50 sq. yds.

FERRODOR ANTI-CORROSIVE PAINT.

The World's Best Anti-Corrosive Paint for wood, iron or steel structures, gas and chemical works, accumulator battery rooms, refrigerating plants and all seaside buildings. It is rust resisting and rust preventing. Non-poisonous and does not affect water used for domestic purposes. Supplied in paste form or mixed ready for use.

Prices according to colour in 1cwt. drums from 125/– cwt. upwards, and 1 gallon tins from 21/– gal. upwards. Further information from agents, *see advt., p.* 6.

WATERPROOFING COMPOUNDS, ETC.

"**Silacene**," a thick mastic compound for furnace repair work. A substitute for fire bricks.

Toxement patent R.I.W. waterproofing compound, for concrete or steel. Made in grey powder form, paste and damp resisting paint. 11d. pound.

Yur-ite Australian product is a waterproofing compound or paste, used by plasterers in rendering building surfaces, concrete surfaces.

For below surface level, mix two gallons or 18½ lbs. with 1 bag of cement to 2 bags of sand. Render **walls** ¾in. thick, and **floors,** 1in. thick ; 9¼ pound tins 13/8 ea. ; 46¼ pound tins 60/9 ea.

The price of Yur-ite in plaster, ⅝ to ¾in. thick (exclusive of cost without the rendering in cement, 1 to 3 of sand is 1/7 per square yard, mixture 1 of cement to 2 of sand, 3/4 per square yard.

Manufacturers report that basements throughout Australia, public buildings, banks, hotels, and Wembley House have proved the effectiveness, although cheap. Obtainable various advertisers, *see advts., pp.* 2, 22, 36.

DRAINER

Glazed Earthenware Pipe Drains are measured at per foot run. To include digging and filling in trenches at 5/– per c. yard to average depth of 2 feet.

Labour laying to include jointing in cement, 3 to 1.

Skilled labour, 2/6 per hour.

LAID COMPLETE PER FOOT RUN TO 2 FEET DEEP.

Internal Dia. inches.	Lin. feet per ton.	Sydney price. Per ft.	Excavation.	Laying and jointing in cement.	Total cost.
		s. d.	s. d.	s. d.	s. d.
3	280	0 9	0 7	0 3½ =	1 7½
4	200	0 9	0 7½	0 4½ =	1 9
6	106	1 0	0 8	0 6½ =	2 2½
9	64	2 0	0 11	0 9 =	3 8
12	48	2 9	1 3	1 0 =	5 0
16	32	4 6	1 6	1 6 =	7 6
18	24	5 9	2 3	2 0 =	10 0
21	18	10 0	2 6	2 6 =	15 0
24	15	12 0	3 2	3 10 =	19 0

Drain pipes laid in sandstone-concrete, reckon double prices for 4in. and 6in. pipes.

Excavation.—This item is reckoned 2ft. deep by required width including filling and ramming over pipes at 8/– per c. yd. The cost of any other depth up to about 7ft. may be seen from this: If at the same price per c. yd., 5ft. deep will be about double, and 7ft. deep about treble the price, on account of extra width at top required to lay the pipes.

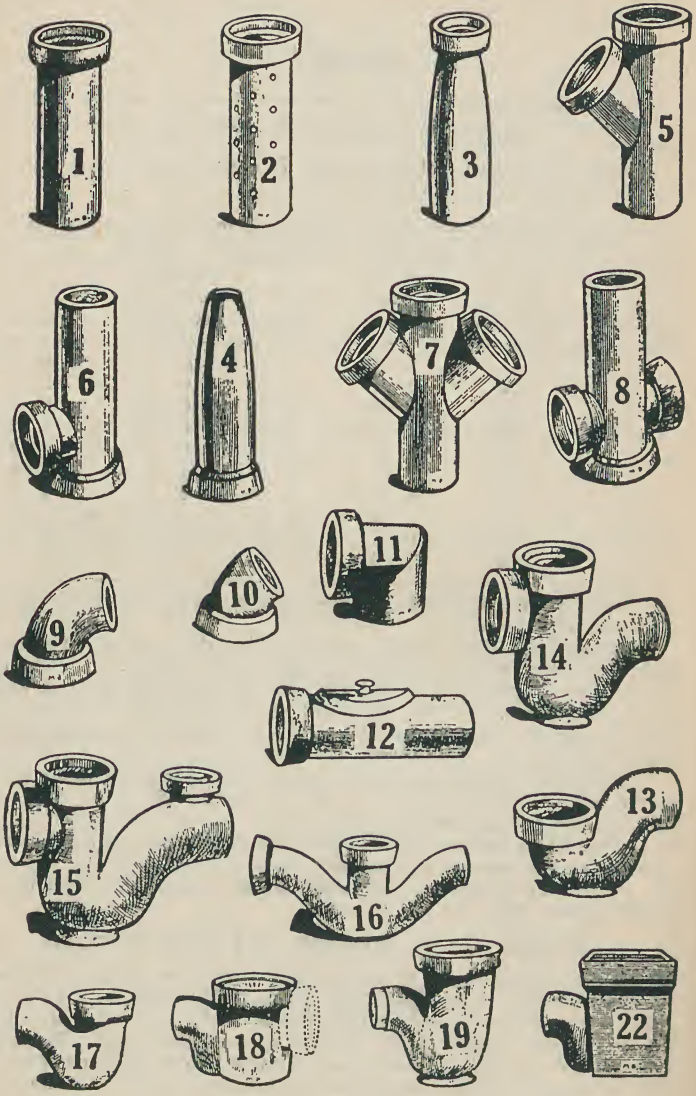
Cutting for drains through sandstone rock, for pipes, add extra to above table:—4in. G.E. pipes, 1/6; 6in., 2/2; 9in. 2/6; 12in., 3/– per foot run to 2ft. deep.

12in. Brick Surface, 3 bricks side by side Drains, bedded in sand and grouted in cement, 2/– per foot run.

Brick on edge against wall and one flat, drainage, 1/6 per ft. run. **Brick edging only,** –/8 per ft. run.

MODERN LAYING METHOD IN 6 FEET SECTIONS.

Make cement joints of pipes three at a time, of 9 inch diameter pipes suspended on straight 10ft. x 6in. x 2in. oregon; or 6in. dia. pipes suspended on straight oregon 4in. x 2in; or 4in. dia. pipes suspended on straight H.W. 3in. x 2in. 10 feet long. **When dry,** lower into drain trench by wire looped under projecting ends of timber, slide along into faucet end prepared with cement joint. This method is used by City Council with their straight mains, leaving 10 feet space at end of trench to withdraw carrier bearers.



See advt., pages 1, 17, 19.

GLAZED EARTHENWARE DRAIN PIPES AND FITTINGS.

(*Prices Fluctuating*).

Pipes (*Fig.* 1), prices, per foot run : **Bends** (*Fig.* 9 and 10) ; **Elbows** (*Fig.* 11) ; **Single Junction** (*Fig.* 5, 6) ; **Taper Pipes** (*Fig.* 3, 4), and **Taper Bends,** Double price of pipe.

Double Junctions (*Fig.* 7, 8), treble the price of an ordinary pipe.

FITTINGS.

	4in.	6in.	9in.	12in.
	s. d.	s. d.	s. d.	s. d.
G.E. Pipes 2 feet long (*Fig.* 1) ...	0 9	1 0	2 3	2 9
Inspection Pipes (*Fig.* 12) ...	4 6	5 6	—	—
Bends (*Fig.* 9, 10)	3 0	4 0	8 0	—
Junctions (*Fig.* 5, 6)	3 0	4 0	8 0	—
P Traps, Plain (*Fig.* 16, 17) ...	5 0	8 6	—	—
P Traps, Inlets	6 3	10 6	—	—
Buchan Traps (*Fig.* 15)	10 6	17 6	37 6	85 0

Gully Traps, Plain (*Fig.* 18, 19, 22), 6in., 7/–. 8in., 8/6. 10in., 11/–. 12in., 13/–. **Inlets,** each, extra 1/–.

C.I. Grates, for Gully Traps, 4in., 1/–. 6in., 1/3. 8in., 1/9. 10in., 2/6. 12in., 3/6.

Gully Risers, 4in., 1/3 ; 6in., 1/9 ; 8in., 2/9 ; 10in., 3/6 ; **Inlets** and outlets, extra 1/– each.

Sink Stones, 18in. x 18in. x 4in., each, 8/6. C.I. Grates, 1/9. **Inspection Boxes,** 3/–.

Grease Trap (*oblong*) and grate, 60/–. Grates, 5/6. (*Round*) and grate, 50/–.

Discs (*earthenware*), 4in., –/4. 6in., –/5. 9in., 1/2. 12in., 1/9. 16in., 2/9.

Perforated Pipes (*Fig.* 2), 4in., 2/9. 6in., 3/9.

Channel Pipes, 4in., 1/5. 6in., 1/11. 9in., 3/6. 12in., 5/6.

Channel Bends and Junctions. Double the price of channel pipe.

U Gutter Tiles, 1ft. long, 4in. wide, each –/6, 250, per ton, A Rates.

Reflux Sink, each, 52/6.

12 inch long **Agricultural Pipes,** per 100, prices and weights.

2 inch, 1 ton 9 cwt., 28/– ; 3 inch, 2 ton 5 cwt., 33/– ; 4 inch, 3 ton 5 cwt., 46/– ; 6 inch, 6 ton, 50/–.

Second quality Drain Pipes, if available, 20 per cent. off list price.

See Manufacturer's Advt. page 17.

GOVT. CONTRACT PRICES FOR LAYING G.E. DRAIN PIPES.

Up to	2ft.deep.	3ft. deep.	4ft. deep.	6ft. deep.
4 inch	2/–	2/6	2/9	3/9
6 ,,	2/6	3/–	3/6	4/6
9 ,,	4/–	4/6	5/6	7/–
In Rock or Sandstone Medium (*Average Prices*).				
4 inch	3/9	6/6	9/6	19/–
6 ,,	4/9	7/6	10/–	20/–
9 ,,	5/6	8/9	11/6	23/–

Fee for connecting to sewer, 5ft. deep, including fittings, about £5.

The rapid increase in rock below 4ft. to 6ft. is about double, owing to extra width required for elbow room in working and casting debris added (*See Trench Table for Excavation*).

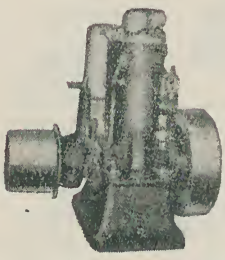
City Council's Fee for repairing or re-laying wood blocking and concrete, 23/– per square yard, using old blocks.

LABOUR AND MACHINERY COST PER DAY.

Trench work with Compressed Air and Jack-hammer tools (the latter cost from £30 to £82 each).

Labour.—2 operators at 20/– and 26/– per day	£2	6	0
1 compressor operator and alternately trepid cleaner ...	1	3	0
Gasoline and oil for Compressor, 10/– depreciation of plant, 14/–; sharpening tools, etc., per day, net	1	11	0
	£5	0	0

After installing in position the above pneumatic plant, the speed of working in Sydney sandstone ranges from 50ft. x 4ft. deep x 3in. wide to 100ft. x 6ft. x 3in. wide in mild free bottom-block-Pyrmont stone in a day of 8¾ hours, according to the nature of the stone and absence of flinty grains, slanting beds, etc.



SCANDIA STATIONARY ENGINE, ½ B.H.P., FOR KEROSENE OR CRUDE OIL.

This Engine is suitable for driving winches, pumps, choppers, electric generators, saws, or planing machines. Speed regulated by Centrifugal Governor fitted direct on crank shaft, adaptable to any speed by handle lever.

The engine can be started in about half a minute's time by means of the special ignition device.

5 H.P., Price £95, upwards.

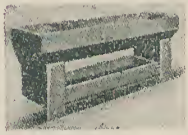
EXCAVATED DRAIN TRENCH.

Example of cost of excavating Drain Trench, 6 x 1ft. 6in., 4ft. sandstone, 2ft. soil, employing choppers at 18/– per day of 6 hours; blacksmith and boy for sharps; compressed pellet blasting powder used, estimate quantity 166 cubic yards, cost £64 10s., or 7/9 per cubic yard.

Bitumen Pipe Joints. G.E. Sewerage Pipes, Melbourne City Council, have in some instances been jointed with coal tar, bitumen and blue stone dust mixture, sold in blocks at £7 per ton, by the Neuchatel Asphalt Co. 10lb. brick will do two joints of a 9in. pipe.

MUNICIPAL STREET WATERING TROUGHS.

Reinforced Concrete, 8ft. x 2ft. wide x 1ft. 6in., on stand, complete, £10 13s. With dog trough under, £13 5s.



WEIGHTS AND FREIGHTS, N.S.W.

G.E. Drainpipes per Rail.

3in. dia. ...	...	150 per ton	12 dia.	...	...	24 per ton
4 ,, ...	...	100 ,,	16 ,,	...	...	15 ,,
6 ,, ...	...	60 ,,	18 ,,	...	...	10 ,,
9 ,, ...	...	34 ,,	24 ,,	...	...	7 ,,

1 ton C Rates. Less than 15 cwt. 1st class rates.

In 5 ton lots in 4-wheel truck, B rates; 6 ton about 3/– per ton for each 10 miles.

T.C. Air Bricks.

300 per ton, 2nd class rates, about 6/6 per ton each 10 miles M rates full truck, 1/9 per ton each 10 miles.

Flower, Chimney, or Earthenware **Pots,** B rates full trucks.

Shipping Rates N.S.W. Coast from Sydney.

About –/6 for 4in. pipes; –/9 for 6in. pipes, &c.

Or quotations for quantity per ton or bulk, insurance to be paid and arranged with insurance office by consignor.

Portable Shear-Legs. For constructional work, pipe laying, stone setting and general outdoor purposes. The following prices do not include pulley-blocks.

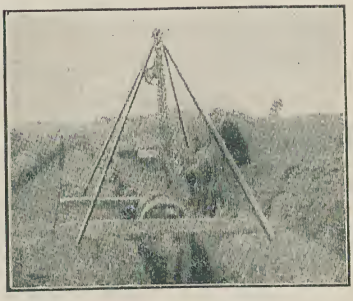
Working Load. Price per Set.

Three-Legged Shear.

Tons	1		2		3	
legs	£	s.	£	s.	£	s.
10ft.	10	10	12	0	13	0
12ft.	11	5	13	10	14	10
15ft.	12	5	15	0	16	5
20ft.	19	0	20	15	22	5
22ft. 6in.	21	0	22	15	24	5

Four-Legged Shear.

Tons	1		2		3	
10ft.	14	5	15	15	16	15
12ft.	15	5	17	10	18	15
15ft.	16	5	19	5	20	15
20ft.	23	10	26	5	28	0
22ft. 6in.	27	0	29	15	31	5



Prices are approximate
Firm quotations on application.
Noyes Bros. (Sydney) Ltd.

The notable features of the head design, eliminating all securing bolts and pins, call for special notice. When the legs are erected it is quite impossible for the components to come apart.

Miners and Rock Choppers' Award, 1936, per hour.

	s.	d.
Sewer trenches at 36 hours per week	3	3
Other than sewer trenches	2	8
Sewer miners driving tunnels without explosives	5	1
Ditto, after breaking through	3	9
Driving sewer tunnels in sandstone over 40 s. ft. area face	2	8
Sinking shafts in sandstone under 40 ft. area....	3	3
Trench and shaft sinkers, over 20ft.	2	3

Drain Testing and Clearing Appliances.

Cylindrical Air-bag " Stopper," with 6ft. of air tube and cock—2in. dia., 10/– ; 2½in., 11/– ; 3in., 13/– ; 4in., 17/– ; 5in., 18/– ; 6in., 19/– ; 7in., 20/– ; 8in. 21/– ; 9in., 25/– ; 10in., 28/– ; 12in., 35/– ; 15in., 44/– ; 18in., 50/– ; 21in., 70/– ; 24in., 86/– ; 27in., 106/– each.

Add 25 per cent. on to prices in Australia.

Air Pumps, hand, 10/– each.

Lever arm for applying interceptor stopper, 15/–.

Drain Rods, light cane, £6 to £8 per 100ft.

Drain Rods, Malacca cane, brass screw junctions with straps, per 100ft., from £8 to £12.

6in. Scrapers, 10/6 ; Plungers, 10/– ; Archimedian Screw Cleaners, 3in., 9/– ; Whalebone Drain Brushes, 4in. to 12in. dia., 25/– to 30/–.

ARTESIAN SURFACE WATER DISTRIBUTING DRAINS.

Distributing earth drains, to carry bore water from Artesian Wells over mostly black, sticky soil, or red soil of the Plains. Total cost, including equipment, from £10 to £15 per mile, or 2d. to 5d. per cubic yard, the drains containing about half a cubic yard for every running yard.

CAPACITY OF TANKS.

CIRCULAR COR. IRON.
Reputed Capacity.

Diam.		Height of Tank. 4ft.	5ft.	6ft.	8ft.
ft.	in.	gall.	gall.	gall.	gall.
3	3	200	250	300	400
3	6	240	300	360	480
3	9	280	350	420	560
4	0	310	390	470	620
4	4	—	—	540	720
4	6	—	—	590	787
5	0	—	—	720	960
6	0	—	—	1,050	1,400

SQUARE IRON : 2ft. 8in. sq., 100 gall. ; 3ft. 3in. sq., 200 gall. ; 3ft. 8in. sq., 300 gall. ; 4ft. sq., 400 gall.

WATER.

1 pint pure water weighs 1¼lb.
1 gallon pure water contains 277.274 cubic ins.
1 cubic ft., distilled water, 62 deg. Fahr., weighs 62.321lbs.
1 cubic yard distilled water, 60 deg. Fahr., weighs ¾ ton.
1 cubic fathom distilled water, 62 deg. Fahr. weighs 6 tons.

EXCAVATOR.

EXCAVATOR'S WORK.

Per cubic yard, including hand plant, explosives, etc.
Basis Wages, 2/3 per hour.

HAND LABOUR.	s.	d.
1. Sand or loose soil, shovel work (getting and casting only)	1	6
2. Hard ditto, or loam pick and shovel work, ditto ...	1	9
3. Wet Mud, sand, or silt, getting and casting	2	0
4. Getting and casting, or filling into drays, earth, &c., not more than 3 feet deep, *pick and skovel work*	2	6
5. Ditto, from 6 to 12 feet deep, ditto	4	0
6. Ditto, from 12 to 18 feet deep, ditto	7	0
If in stiff clay or hard gravel, add to items 4 and 5 ...	0	9
If in soft rock or loose boulders, add ditto	2	0
If in hard sandstone or shale, add ditto	3	0
If in compact bluestone or trap, add ditto	6	0
If in compact granite, gneiss, or sienite, add ditto ...	10	0
If wheeled one *run* of 20 yards, add	0	9
Ditto for every additional *run*, add	0	5

N.B.—If the excavation is from the face of an open cutting, the cost will be the same as if not more than 6 feet deep as per 4th item. This work is facilitated by partly undermining and then wedging down with iron bars or explosives used.

Items 5 and 6 are only used when the earth is raised to the surface in lifts, as in cellars or basements, gasholders, &c. If these holes are large enough, the best way is to cart the stuff by a spiral road, gradually descending towards the bottom and then raise the earth, &c., forming the temporary road, by lifts or barrows with planks.

In excavating for covered Reservoirs on hills, the gullets, or tunnels, required for the inlet and outlet pipes may be used as inclines for the removal of the earth, shale, &c., from the side of Reservoir and afterwards for carting the materials, &c., required for the lining, into the Reservoir.

The prices for excavating are on a small scale, but if expensive plant has to be bought for one contract only, it would not pay at these prices.

HAND LABOR EXCAVATION PRICES GENERALIZED, Cubic Yard.	s.	d.
Excavation in Earth, including wheeling 30 yards, spreading, levelling, filling in and ramming	4	0
Ditto, trenches, ditto, in trenches 2ft. to 4ft. wide ...	5	0
Excavation in Sandstone, including wheeling, 35 yds.	17	0
Ditto, ditto, with blasting	12	6
Ditto, ditto, large areas and good face	5/– to	8 0
Channelling in Sandstone, by hand, per foot super., wages 3/– per hour	2	6
Compressed Air Machine Channelling or Guttering	1	6
Levelling and scabling in Sandstone, bottom of trenches, per foot super hand labour	1	0

Reservoir dams for "Molesworth."—Width at top in low dams should be equal to the height. Breast or inside slopes, 3 to 1; back slopes, 2 to 1. Height above surface of water not less than 3½ feet.

Getting and raising coal (thick seams), per ton, from 5/– to 9/–.

When Machine Undercutters are used divide by 2.

Divide items by 3 for Steam Shovels.

Foundation trenches should be kept separate and estimated apart from other building excavation. Take the full length and width of bottom footings; multiply by the depth from surface. By reference to Table, the cubic contents of length and width by one foot deep can be ascertained at a glance. Then multiply by the depth required.

This Table is also useful in finding capacity for square tanks, sinking, or other excavation, by multiplying and adding.

SOLID OR CUBIC MEASURE.

1,728 cubic inches	...	...	...	...	...	= 1 cubic foot
27 cubic feet	...	...	...	...	...	= 1 cubic yard

WEIGHT OF EARTHS AND ROCKS.

Per Cubic Yard.

		cwt.			cwt.
1 cub. yd.	Earth weighs ...	26	1 cub. yd.	Sandstone weighs	36
1 ,,	Sand weighs ...	30	1 ,,	Marl, Clay or Shale	38
1 ,,	Ironstone Gravel	36	1 ,,	Quartz	41
1 ,,	Quartz Gravel	30	1 ,,	Trachyte ...	43
1 ,,	Clay	31	1 ,,	Granite	43
1 ,,	Mud, wet ...	35	1 ,,	Slate	44

A FAIR DAY'S WORK FOR A NAVVY—8 HOURS.

Pick and Shovel work:— 3 to 5 cubic yards stiff soils; 7 to 10 cubic yards ordinary loams; 10 to 16 cubic yards sandy soils.

An ordinary tip cart, empty, weighs 10cwt., and holds about 23 cubic feet loose shale, or 12 cubic feet in the solid; thus taking 2¼ loads to the cubic yard in the solid; usual filling about 5 loads to 2 cubic yards solid.

Ten navvy barrow loads to the cubic yard.

INCREASE OF EARTH WHEN EXCAVATED.

Rock or shale increases in bulk from the solid about double; therefore, to obtain the price for leading per cubic yard in cutting, reckon about 2¼ times the above prices.

For hard clay, loam, gravel, conglomerate, and similar dense materials, reckon 1¾ times the above prices.

If miners trucks on rails are used, there will be a saving in the loading, because of the less height the stuff has to be lifted. If the leads are short, say less than 4 chains, barrowing with planks will be still cheaper, the height of the barrows being even lower than the miners' trucks.

THE NATURAL ANGLE OF REST FOR MATERIAL EXCAVATED.

Dry Sand, Sheltered	22 degrees	Clay	45 degrees
Wet Sand ...	38 ,,	Rubble or Mine Tips	45 ,,
Earth or Soil ...	30 ,,	River Shingle ...	40 ,,

CARTAGE PER ONE-HORSE LOAD.

Basis. Labor 2/–. Horse, dray, and driver, 3/3 per hour.	s.	d.
Carting, tipping, and levelling, *lead* not more than quarter mile, per cubic yard	1	6
Ditto, from quarter to half mile *lead*, ditto	2	6
Add for every extra half mile ditto ditto	1	6
Filling earth spoil, carting 1½ miles and tipping, per load	5	0
Ditto, white hard metal in spawls, loaded and delivered 3 miles along metalled road	8	0

Ordinary single horse drays contain about 18 bushels, or 23 cubic feet.

RAILWAY AND EXTENSIVE WORKS.

In the following Tables on Excavation, the earth, rock, etc., excavated are reckoned in *situ*, *i.e.*, in its undisturbed and natural state.

Cuttings and embankments.—In equalising the contents of cuttings and embankments for roads, railways, &c., it is not usual to make any allowance for the increased bulk of loose material, except in increasing the height of the embankments for settlement, the extent of which will depend upon the material, rock settling down the least and wet clay the most; it is always considered favorable to the contractor to pay him for embankments, if he had taken the work by the cubic yard.

Proportion of getters, fillers, and wheelers, for run of 40 yards.

HAND WORK NOT ASSISTED BY MACHINES.

	Getters.	Fillers.	Wheelers.
In loam, earth, sand, gravel, clay, &c.	1	1	1
Hard earth, or gravel, marl, &c. ...	1	2	2
Hard clay, loose shale, &c.	1	1¼	1¼
Rock, if blasted, or broken up, from	3	1	1

MEASUREMENT OF EARTHWORK.

In the measurement of cuttings and embankments with slopes, the common system of average heights gives less, and the common system of average areas gives more than the true contents; the proper system is by the *prismoidal formula*, from which the annexed table for the measurement of earthwork is calculated, but even in this case the cross section is presumed to be perfectly level, the slopes to be quite true, and the change from chain to chain regular and gradual, otherwise the measurement is incorrect.

To show the necessity of correctly ascertaining the cubical contents of earth-work, where the contractor tenders for a *lump* sum, I have taken the following from M'Neil's Earthwork Tables, which are calculated from the *prismoidal formula*:—

"In calculating the contents of embankments and cuttings in a section, the true content of which is 332,390 cubic yards, by the common methods of mean heights is only 310,652 cubic yards, thus making 21,738 cubic yards less than the true content; by the common method of mean areas the error in excess will be 43,487 cubic yards."

Extract from S.M. Herald, Nov., 1930.

In the construction of City Railway 20 years ago, 2,000 men and 400 tip carts would have been employed, but with the modern machinery 300 men and 30 motor-lorries are employed.

With the Electric and oil Machine Shovel, Dragline, Clam-shell Excavator, varied Loading Devices, Tractors and Speedy Transport, &c., the construction of extensive works have eliminated 75 per cent. of the human labor (*directly*) but the cost of works have not altered in the same proportion, to less than half, so reckon 50%.

CONSTANTS FOR ESTIMATING.

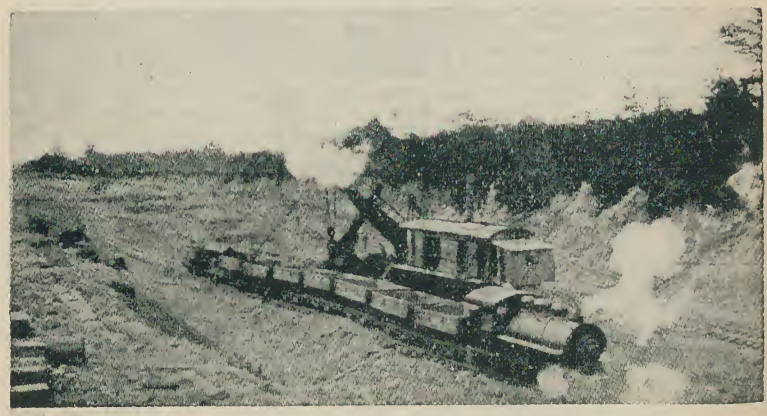
Prismoidal Formula.—Average area equal to four times the middle area added to the sum of the end areas and divided by six. In using the following constants instead of dividing the sum of the areas by six, multiply them by the following constants for the length required in chains :—

Cuttings and Embankments.

Sum of areas in feet multiplied by			0.204	—cubic yards in		½	chain
,,	,,	,,	0.408	,,	,,	1	,,
,,	,,	,,	0.612	,,	,,	1½	,,
,,	,,	,,	0.815	,,	,,	2	,,
,,	,,	,,	1.223	,,	,,	3	,,
,,	,,	,,	1.630	,,	,,	4	,,
,,	,,	,,	2.037	,,	,,	5	,,
,,	,,	,,	2.445	,,	,,	6	,,

The ends of cuttings on sidelong ground always form a pyramid, for which multiply the area of the base by one-third the length.

In light or shallow cuttings and embankments for railways, roads or tramways, the common average area will be sufficiently near for tendering, as it gives an excess in measurement in proportion to the inequalities of the heights. If the heights are given at every chain, " Bidders Tables " will give the readiest and most correct measurements to the nearest foot in height if the cross section of ground is tolerably level.



Loading Earth into Railway Dumping Trucks with Steam Shovel.

EARTHWORK, ROCK, etc., at per Cubic Yard.

Standard Table.

Reckon extra for existing wages.

EXCAVATORS AT 1s., HORSE, DRAY AND DRIVER AT 1s. 6D. PER HOUR.

Lead in yds.	Light Soil.	Loam.	Heavy Soil.	Stiff. Clay.	Shale.	Hard Rock.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
33	1 0	1 2	1 3	1 6	3 2	5 0
67	1 1	1 3	1 4	1 7	3 4	5 2
100	1 2	1 4	1 5	1 8	3 6	5 3
150	1 3	1 5	1 7	1 10	3 8	5 5
200	1 4	1 6	1 8	1 11	3 10	5 7
250	1 5	1 7	1 9	2 0	4 0	5 8
300	1 6	1 8	1 10	2 1	4 2	5 10
350	1 7	1 9	1 11	2 2	4 4	6 0
400	1 8	1 10	2 0	2 3	4 6	6 2
450	1 9	1 11	2 1	2 4	4 8	6 4
500	1 10	2 0	2 2	2 6	4 10	6 6
600	2 0	2 2	2 4	2 8	5 2	6 10
700	2 2	2 4	2 6	2 10	5 6	7 2
½ mile	2 6	2 8	2 9	3 2	6 2	7 6
1,000	2 7	2 9	3 0	3 4	6 6	7 9
1,200	3 2	3 3	3 4	3 8	6 10	8 1
1,500	3 8	3 9	3 10	4 3	7 4	8 8
1 mile	4 2	4 3	4 4	4 9	8 0	9 2
1¼ ,,	4 8	4 10	5 0	5 7	8 9	10 0
1½ ,,	5 4	5 6	5 8	6 4	9 6	10 10
1¾ ,,	6 0	6 2	6 4	7 0	10 3	11 8
2 ,,	6 10	7 0	7 2	7 8	11 0	12 6
2¼ ,,	7 8	7 10	8 0	8 4	11 9	13 4

CONSTANTS FOR ESTIMATING.

1938, Present Wages, Reckon Double.

N.B.—The first two or three items to be removed by wheelbarrows, The whole is an open cutting, the shale and hard rock including explosives.

The Average Weight of Sandstone is about 15 cubic feet per ton in place, or 36cwt. per cubic yard, and as it increases about four-fifths in bulk in removal, a solid cubic yard will be about two single horse loads. In bluestone, granite, or marble it will be about two tons, or fully two loads.

A barrow load will be about two cubic feet, or 12 shovels of No. 5 size.

SURFACE WORK.

PER SUPERFICIAL YARD, INCLUDING TOOLS, Etc.

Wages, 2s. per hour.

	s.	d.		s.	d.
Levelling made earth not more than one foot deep				0	4
Surface forming for roads not more than 9 inches deep, in earth, hard clay, &c.	0	6	to 0	8	
Ditto do. in rock	1	6	to 2	0	
Soiling slopes of embankments and cuttings ...	0	8	to 1	0	

TURFING.

Turfing, removing, and re-laying grass turf ...	2	0	to 2	10	
Getting and carting sods, 1 mile	1	2	to 1	6	

RAILROAD CONSTRUCTION SYSTEM USED ACROSS AUSTRALIA.

The materials are run out direct to the rail-head.

The track-layer, is operated by a vertical stationary engine. The Conveying apparatus is attached to each side of the train for its whole length as an endless belt. Sleepers along one side of the train, on the other side the rails are carried. Two jibs projecting in front, one for sleepers, and one for the rails.

A rope being stretched along the formation to indicate the exact position of the ends of the sleepers. The rails are secured on the sleepers, the train moves on 33ft., and the same process is repeated. The first trans-Australian line was constructed in 1914.

EXCAVATION TIMBERING.

Oregon at 38/– per 100. Labor, 2/6 per hour.

Timbering to open drains, 8ft. deep x 2ft. 6in. wide, repeated use of timber. Add 2/– to 3/6 per cubic yard on excavation.

Close walling and staying trenches, rough planking and labor, both sides, 2ft. 6in. x 5ft. deep, 2/– per foot run ; 2ft. 0in. x 8ft. deep, 3/– per foot run. Over 2ft. 6in., up to 4ft. wide, add quarter more for strutting.

Galvanised corrugated iron sheets, with cross rails, preferred in some instances. If timbering is used in made ground, reckon for pointing boards, driving and staying, from 3/6 to 5/6 per yard super. For centering.—*See* **Carpenter** for timbering, and below for patent, corrugated sheeting.

PLOUGH AND SCOOP WORK.

A plough, with four horses or six bullocks and two men at 90/– per day, will loosen from 200 cubic yards at a cost of 5½d. per cubic yard.

Two horses drawing a ½ cubic yard scoop at per day will remove 54 cubic yards generally, depositing earth 50 feet, at about 9d. per cubic yard, ploughing and scooping, 1/2½ per cubic yard of **earth,** it all depends upon the distance earth is deposited.

For instance :—**A square tank** in hard black soil of the plains, 80 feet square at the top, 40ft. square at bottom, battered sides, 10 feet deep, containing 14.00 cubic yards, cost £100 or about 1/5 per yard.

Another tank, soil 120 feet x 12 feet deep. 60 feet bottom 48 feet battered sides, slopes 1ft. in 1ft., containing 2,200 cubic yards; 6 bullocks, with plough and scoop, going through the hole backward and forwards, and depositing soil each end on bank, 10 yards from edge, cost £150, or about 1/4½ per cubic yard net.

PLOUGHS, SCOOPS AND SCRAPERS.

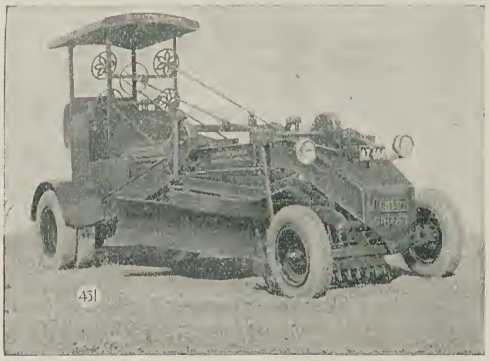
3-wheel Scoops.—Are great labour-savers for hauls not exceeding 5 chains. Cost from, 9 cubic ft., £18; 24 cubic ft., £25 each.

Heavy Road and Tank-making Ploughs, from £18.

Drag Scoops for short hauls.

Solid Steel Drag Scraper, 7 cubic ft., £5; 5 cubic ft., £4 10s.; and 3½ cubic ft., £4. Weight, 100 to 80 lbs.

See Grading Machines—Roads.



Road Grader on Pneumatic Wheels, approximately £658 to £1500. Ploughing up Surface of ground.

Reckoned at 20s. per acre.
is equal to 1½d. per rod, or .05d. per sup. yard; at 40s. per acre, equal to 3d. per rod, or ½d. per cubic yard.
Different rates for ploughing per acre can be reckoned in proportion.

TO MEASURE EXCAVATED TANK.

To ascertain the contents of a tank with sloping sides, add the superficial area in feet at the top to that at the bottom, and four times half-way down batter. Divide by 6 and multiply by the depth; result = the cubic contents in feet, multiply this by 6¼ to find the number of gallons tank would hold.

Special Excavation, as under, cost :—A Curved Trench, 20 feet radius, with plumb sides, sunk in hard shale, containing iron-stone bands for water-main pipe—

7ft. x 6ft. x 8ft. deep = 336 cubic feet = $12\frac{1}{2}$ cubic yards, actual cost, 10/– per cubic yard.

8ft. x 6ft. x 5ft., straight, cost 7/– per cubic yard.

Filling in above, and ramming in 6in. layers, 3/– per cubic yard.

For Stone Excavation—*see* **Mason and Quarrying.**

Wages, 2/6 per hour.

SINKING TANKS, WELLS, OR SHAFTS.

Per cubic yard, including tools, tackle, and powder.

Wages of Well-Digger, 2/3 per hour.

	s. d.	s. d.
Excavation for wells or small tanks or shafts, not more than 20 feet deep, light ground	3 6	to 5 0
Ditto in stiff clay or hard gravel	4 6	to 7 0
Ditto in sandstone, hard rock, or shale	18 0	to 27 0
Ditto in bluestone or other trap-rock	36 0	to 40 0

From 20 to 50 feet deep, add one-third.
From 50 to 70 feet deep, add two-thirds.
From 70 to 100 feet deep, reckon double.

Guttering in coal shale or soft shale, per super ft.	0 10	to 1 0
Guttering in sandstone, per super. foot	2 6	to 3 0
Ditto in bluestone or granite, do.	5 0	to 7 0

N.B.—In the third and fourth items, take the least price for the largest, and the greatest for the smallest wells, on account of the difficulty of working and blasting rock in confined areas.

If blasted with explosives, one side of the tank or well must be kept above the other, to give a face and render the blasts effective. *See* Quarrying.

Guttering.—In rock excavation, where any portion of sides are required to be left even or picked, a groove or gutter must be kept in advance of the main excavation to prevent injury to sides by blasting.

Gutterers, or Rock-choppers' wages, 24/– per day of 6 hours.

See Plant for Guttering Machines.

MINING.

SEWER TUNNELLING AND SHAFT SINKING.

Per lineal foot (all found).

Drive 4 x 3 for sewer, Sydney sandstone	24/– to 32/–
Drive 7 x 7 in Sydney sandstone	40/– to 54/–
Drive 6 x 3 in hard, compact rock (trachyte) ...	50/– to 60/–
Ditto in clay or soft shale	20/– to 30/–

RAILWAY TUNNELS.

Railway Tunnel.—If the rock is self-supporting, after reckoning the cost of guttering both sides and top, the *core* may be removed at about double the cost of similar rock in open cutting, but when timbering is required for subsequent lining, the cost is uncertain.

Per cubic yard.	Without guttering.	With guttering
Tunnel, 20 x 15, sectional area 30 super. yards, curved all round through hard bluestone rock	30/–	48/–
Ditto, ditto, through granite, &c.	42/–	72/–
Ditto, through soft clay, slate, or shale	21/–	37/6

Confined space quarrying, no explosives used :—Sinking circular tank in sandstone rock—10 feet 6in. diam. x 13 feet deep = 42½ cubic yards ; including scappling, sides and bottom :—One man, 500 hours at 2/–, £50 ; about 23/6 per cubic yard.

Reckon for existing wages.

MINING IN FLESITE (BURRAGORANG) FOR SILVER LEAD ORE.

Including Haulage and Explosives.
Miner's Wages, 27/– per day ; Trucker's, 20/–.

Hand Tools. 1936	Cost per foot deep.
Sinking shaft on underlay, 30 degrees incline, " Felsite," with horse-whip and ½-ton trucks, to 300 feet from surface, 9 x 6 ; good holding ground, " stull " posts only	£3 18 0
Ditto, to 300 feet, vertical shaft, plain	4 10 0
Ditto, to 300 feet, with " stulls " posts only	5 0 0
Ditto, to 400 feet, steam haulage, 12 x 8 shaft, close timbering	4 18 0
Sinking shaft, 12 x 8, to 600ft., by hand drilling, " Felsite "	6 10 0
Ditto, with steam winding gear and air compressed rock drill, at 600 feet, 12ft. x 8ft. shaft, good holding ground, " stull " posts only, average about	6 10 0
Driving levels, 7ft. x 7ft. 6in.	4 0 0
Driving levels, 6ft. x 6ft.	3 15 0

These items include laying rails and timbering, but not management, or the erection of buildings on the surface. The hand labor for shaft includes erection of engine and boiler

Prospecting Tunnel in Felsite, fall from face to outlet, 200 feet x 6 feet x 4 feet (trucks and rails found)	25/– to 35/–
Driving tunnel, 9 feet x 6 feet, fall from face to outlet, up to 300 feet, full cost...	3 0 0

MINING SHAFTS.

Double Shaftsinking.—Shaft 10 feet by 4 feet wide, timbered with 9 x 3 H.W., with two cage and one ladder compartments, each about 3ft. 6in. x 3ft., with two 9 x 3 centres, the two centres and two ends to be let into grooves cut into the sides or wall plates, mitre fashion, so as not to weaken the timber. An opening of two inches is generally left at every fifth set, so as to get in a stage board for repairs. The centres fit close and ensure good ventilation, even for a shaft 2000 feet deep, giving an *upcast* and a *downcast* current.

The ladders are inclined with a stage and manhole, not more than 30 feet apart. *See Mines Act.* A shaft as above, with machinery, pumping gear, fuels, &c., will cost about £20 per foot in depth.

Tanks.—Unless there is a face or side obtained in sinking tanks or shafts in rocks, the explosive used will have little effect. It is therefore usual to keep one side of the tank or hole at least two feet above the other, where practicable. This remark also applies to drives or tunnels.

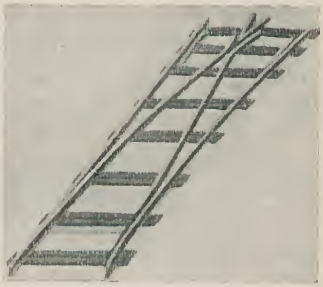
Hand Drills large open excavations in sandstone Cost from 6/– to 15/– per cubic yard, with machine drills, 4/– to 10/– per cubic yard.

Wages Award.—Operator, 2/9 machine (compressed air) drills.

Machine (compressed air) drills have revolutionized this work. Successive holes, 1½in. diameter, drilled 6 to 9in. apart in a line where cleavage is to be made. Speed from 30 to 40 feet drilling per hour, in 4 feet holes—15 to 20 feet deep—in one length.

PORTABLE STEEL TRAMWAYS.

TRAMWAYS FOR CONTRACTORS AND MINERS.



PERMANENT LIGHT STEEL TRAMWAY.

Standard Sizes of Tee Section Rails Stocked.

STEEL TRAMWAY RAILS.

Per yard. lbs.	Lengths. feet.	Depth. feet.	Head. inch.	Bottom. inch.	Price Approx.
14	12 to 16.6	$2\frac{1}{8}$	$1\frac{3}{32}$	$2\frac{1}{16}$	
20	18 to 30	$2\frac{9}{16}$	$1\frac{3}{8}$	$2\frac{3}{8}$	£18/10/–per
*30	18 to 30	3	$1\frac{5}{8}$	$2\frac{7}{8}$	ton
45	18 to 30	$3\frac{11}{16}$	2	$3\frac{11}{16}$	
60	30 to 40	$4\frac{1}{2}$	$2\frac{1}{2}$	$4\frac{1}{4}$	£15/–/–
80	30 to 40	$5\frac{1}{16}$	$2\frac{1}{2}$	5	

*Suitable for locomotive work.

By adhering to the above standard sections, renewals of the same section and length may always be obtained from stock.

Fishplates, Bolts and Nuts are supplied with the Rails.

Spares can always be supplied from stock.

Dogspikes for fastening the above Rail to Timber Sleepers, from £1/17/6 per cwt. (approximate) f.o.r. or f.o.b., Sydney.

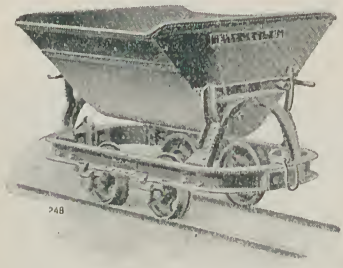
Switches or Turnouts with steel sleepers attached, for light sections, per set, £10 to £12/10/–.

STEEL TIPPING KIBBLES OR BUCKETS, $\frac{3}{16}$in. plate.

18 cub. ft. capacity, approx. £12/10/–.
23 cub. ft. capacity, ,, £25/–/–.

STANDARD STEEL TIP TRUCKS.

Heavy Pattern Steel Double Side Tip Trucks with improved roller bearings, automatic self-locking fastener, and bulb-iron rims are stocked in Sydney, as follows :—



Standard Trucks with Plain Body.

Capacity $\frac{1}{2}$ c. yd., gauge 24in. approx. : price each, £16/10/–.
,, $\frac{3}{4}$ c. yd., gauge 24in. approx. price each, £17/10/–.
,, 1 c. yd., gauge 24in. approx. price each, £18/–/–.

Double End Tip Trucks of same construction as above, but arranged for end instead of side tips, £2/10/– extra.

All prices include delivery f.o.r. or f.o.b., Sydney.

DOUBLE ACTING STEAM PILE-DRIVING HAMMER.

For driving sheet piling up to 18 feet long, excavation, timbering, or sinking round piles, 9ins. to 20ins. diameter, up to 60ft. long.

The weight of hammer is always resting on top of pile during the blows delivered, from 150 to 200 per minute, as desired.

Price delivered on rail, up to £300.

Short Stroke Steam Hammer, fitted with pile pulling attachment, so that hammer can be used for either driving or pulling piles. Short rate, 150 blows per minute. Minimum stroke, 16 inches.

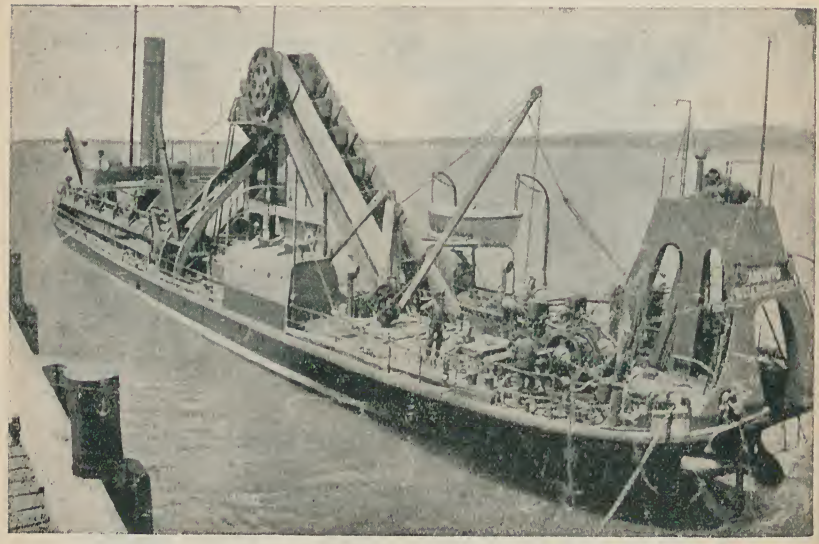
Long Stroke Hammer, minimum stroke, 24 inches. Rate 110 strokes per minute. Short stroke, 6.000 ft. lbs.; Long Stroke, 9.650 ft. lbs. Price: Long Stroke, £450; Short Stroke, £400; Pulling Attachment, £60.

Note. The above prices are approximate. Agents cannot submit firm quotations for this class of material.

IMPROVED PILE CAP.

A new self-contained Pile Cap for these Steam Hammers that will eliminate the use of the loose striking plate.

The new Pile Cap is a loose steel cap casting retained in the base of the hammer. It has a conical space on its under side to fit the head of the pile which is merely trimmed to fit this conical depression. The hammer rests correctly on the pile for the hammer.



Excavating by Ladder Dredge.

HARBOURS AND RIVERS.

Government Works Department Report.

	Per ton.
300 days run of 8 hours, " Newcastle " dredge, sand to 26ft. level, and discharging at sea, 10 miles, cost... ...	3.16d.
At Newcastle, per dredge " Glaucus," sand to 26ft. level, 394,440 tons, dreding alone	1½d.
Including discharging at sea	2¼d.

Sand on rough rock bottom, costing from 9d. to 1/– per ton.

SUCTION PUMP DREDGING.

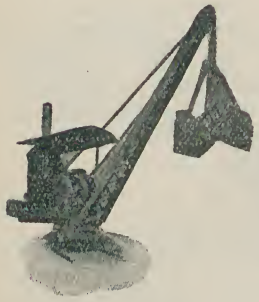
Per ton.

Suction Pump Dredge at Byron Bay, sand and shingle 4.26d.
Suction Pump Dredge "Jupiter," sand, mud and shingle, 128,331 tons sand, clay, shell, mud and stone ... 4.11d.

Alluvial dredging, Araluen, G.D. Co., from two ladder dredge, old river bed :—

20ft. above and 25ft. below water, average 55,000 c. yards, cost £80 ; 18ft. above and 28ft. below water, average 11,000 c. yards, cost £80. $\frac{1}{3}$d. to $1\frac{3}{4}$d. per c. yard.

The cost of dredging and towing out to sea five miles, varies from 3d. to 10d. per ton, according to material excavated.



GRAB DREDGES.

Priestman Bros.' grab is a very effective excavating machine, like a steam crane.

Cost of working.—The Sydney Harbour Board has dredged heavy silt at $1\frac{3}{4}$d. per ton.

A railway contractor who was paying 6d. for excavating bridge foundations, subsequently did the same for less than 2d. with one of the above machines.

HAYWARD'S AUTOMATIC GRAB BUCKETS.

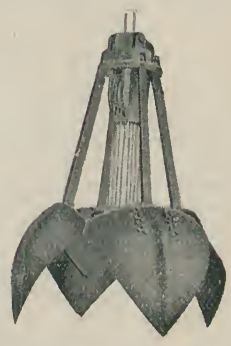
For digging, dredging, and re-handling.

This is a "**grab**" **excavator,** operated by wire ropes at the end of a **jib** or **boom,** travelling cable way or electric hoist, and contains steel movable sections that open and close on the material to be removed.

The **Orange Peel** pattern bucket excavator is made in three and four sections, according to capacity of bucket, with the digging points of manganese steel, shaped like a small plow (*See illustration*).

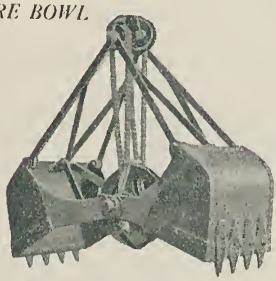
One cubic yard capacity bucket orange peel averaged 400 cubic yards every 10 hours in uncemented gravel and sand. Price, approx. £280.

Being circular, it is suitable for working inside round spaces, sinking **cassions** and **bridge** columns.



Orange Peel pattern Bucket.

CLAM SHELL BUCKETS WITH ORE BOWL



Clam Shell pattern Buckets, single chain, 4 cubic feet, £100; 82 cubic feet capacity, £275.

The **Clam Shell** pattern bucket excavator is suitable for transferring sand, crushed stone or gravel from truck or "dump." A one cubic yard bucket is said to transfer 400 to 500 cubic yards in 10 hours.

The **Drag Scraper** pattern bucket, as its name indicates, can be closed at will from the operating machine, and does not have to be dragged *home* every trip.

A one cubic yard drag scraper excavator shifted, 200 cu. yds of "Hard-pan" in 10 hours, and 600 cu. yds top soil and clay in 10 hours.

GRABS.

½ yd. capacity, £250; ¾ yd. capacity, £300; 1½ yd. capacity, £330; 2 yd. capacity, £370.

SUBMARINE.

Divers' Award, 1920, 6 hours at 49/–; Attendant, 20/– per day.

Owing to variable conditions, no fixed prices can be quoted. Boring holes for sandstone to receive foot of piles, vary from 30/– to 80/– each.

In bridge foundations, preparatory work, in clearing silt away is usually done by grab dredges. *See* DREDGING.

Scott & Goodsir's Patent Submarine Rock Excavator and Rock-drill, with and without the aid of divers, has done valuable work in Sydney Harbour sandstone, 20 to 30 feet below water. In appearance, it is not unlike a steam pile-driving structure, built on end of punt, with a long cutting chisel working in frame-work, 60 feet high. The operators on platform 37 feet up, as well as on deck, where boiler and machinery are situated. For particulars apply Wildridge & Sinclair, engineers, 82 Pitt street.

Spikes may be successfully driven under water 12 to 20 feet deep, by placing straight pipe or tube in position. Drop spike down inside tube and drive home with iron or steel rod inside tube.

Drilling for explosives under water, with hand jumper from surface enclosed in pipe driven into debris to surface of rock for guidance of work and charging can be successfully accomplished.

Snagging Rivers, by blasting with dynamite, as practised in the Waikato River, New Zealand. The inspection was made by an hydraulic telescope (a gal. iron tube, with glass fixed at end). The holes were bored with 1½in. steel auger.

BUCYRUS STEAM SHOVEL OR "NAVVY."

(*Extracts from "Engineering."*)

In a railway cutting, marl and rock, 20ft. high by 35ft. wide, assisted by blasting, from 300 to 400 cubic yards was removed per 10 hours, at a cost of 6d. per cubic yard (not including blasting) compared to hand labour of 7/– per cubic yard.

A railway contractor working in heavy clayey soil, states the cost of putting clay on waggons was 3d. per cubic yard, against 3/6 former methods.

Bucyrus Steam Shovel.

It is claimed that these and similar oil driven Excavating Machines have shifted in Sydney foundations, clay & shale, as much as 1000 cubic yards per day of 10 hours, the cost of working navvy being 112/– wages; fuel 10/–; 670 gals. water, 6/–; total £6/8/– per day.

Australian present prices for above would be about £12/12/– or 3024 pence for 1000 cubic yards, about 3d. per yard. Add for wear and tear, rail-trucking, 30 per cent.

With the help of a little explosive the navvy shifted the soft English red sandstone very readily, averaging 800 cubic yards per 10 hours.

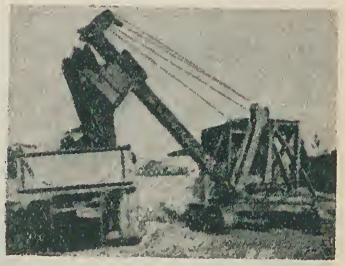
It is also a useful machine for clay and shale pits excavating and loading.

Prices of oil driven " Navvys " range from £2,500 upwards, delivered wharf or rail.

Working Power. Tons.	Total Weight. Tons.	Size of Bucket.	Output per-Day—Tons.
12	$36\frac{1}{4}$	$1\frac{3}{4}$ or $2\frac{1}{4}$	1400
10	$28\frac{1}{2}$	1 c. yd.	900
8	$26\frac{1}{2}$	$\frac{3}{4}$	700

Sand shifting into trucks, electrical grab crane, one half yard bucket, 200 tons per day.

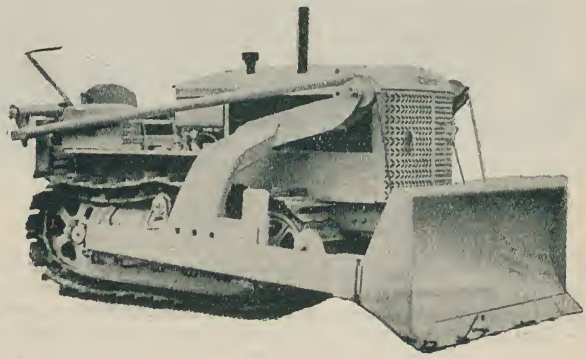
OIL DRIVEN CATERPILLAR EXCAVATOR.



This machine can also be used as a crane, can be fitted with a **Skimmer, Ditcher, drag line Excavator, Shovel** or **Grab Bucket.**

Price $\frac{1}{2}$ c. yd. filler oil driven Caterpillar Tractor, one man operator, £2,300, delivered, Sydney.

Approximate.



£500 to £800.

EMSCO Bulldozer.

Cable controlled with a single or double drum winch Cletrac model, 6ft. 11in. x 8ft. 2in., weight 960lbs. single drum, double drum, 1460lbs.

NUMBER OF CUBIC YARDS IN FOUNDATION TRENCHES, CONCRETE, OR EXCAVATED WORK FOR EVERY FOOT DEEP.

Results in Cubic Yards and Decimals.

Length trench.	WIDTH OF TRENCH.														
	inches.				feet.										
ft.	12	15	18	21	2	2½	3	3½	4	5	6	7	8	9	10
6	.2	.2	.3	.3	.4	.5	.7	.8	.9	1.1	1.3	1.5	1.7	2.	2.2
7	.2	.3	.4	.4	.5	.6	.8	.9	1.	1.3	1.5	1.8	2.	2.4	2.6
8	.3	.3	.4	.5	.6	.7	.9	1.	1.2	1.5	1.8	2.	2.4	2.6	3.
9	.3	.4	.5	.6	.7	.8	1.	1.2	1.3	1.6	2.	2.4	2.6	3.	3.4
10	.3	.4	.5	.6	.7	.9	1.1	1.3	1.5	1.8	2.2	2.6	3.	3.4	3.7
11	.4	.5	.6	.7	.8	1.	1.2	1.4	1.6	2.	2.4	2.8	3.2	3.7	4.1
12	.4	.5	.6	.7	.9	1.1	1.3	1.5	1.8	2.2	2.6	3.	3.5	4.	4.4
13	.5	.6	.7	.8	1.	1.2	1.4	1.7	1.9	2.4	2.9	3.4	3.8	4.3	4.8
14	.5	.6	.7	.9	1.	1.3	1.5	1.8	2.	2.5	3.1	3.6	4.1	4.7	5.2
15	.5	.6	.8	.9	1.1	1.4	1.7	1.9	2.2	2.7	3.3	3.9	4.4	5.	5.5
16	.6	.7	.9	1.	1.2	1.5	1.8	2.	2.3	2.9	3.5	4.1	4.7	5.3	5.9
17	.6	.7	.9	1.1	1.3	1.6	1.9	2.2	2.5	3.1	3.8	4.4	5.	5.7	6.3
18	.6	.8	1.	1.1	1.3	1.6	2.	2.3	2.6	3.3	4.	4.6	5.3	6.	6.6
19	.7	.8	1.	1.2	1.4	1.7	2.1	2.4	2.8	3.5	4.2	4.9	5.6	6.3	7.
20	.7	.9	1.1	1.3	1.5	1.8	2.2	2.6	2.9	3.7	4.4	5.2	5.9	6.6	7.4
21	.7	.9	1.1	1.3	1.5	1.9	2.3	2.6	3.1	3.9	4.5	5.3	6.2	7.	7.8
22	.8	1.	1.2	1.4	1.6	2.0	2.4	2.8	3.2	4.1	4.9	5.7	6.5	7.3	8.1
23	.8	1.	1.2	1.4	1.7	2.1	2.5	2.9	3.4	4.2	5.1	5.9	6.8	7.6	8.5
24	.8	1.1	1.3	1.5	1.8	2.2	2.6	3.	3.5	4.4	5.2	6.1	7.1	8.	8.8
25	.9	1.1	1.4	1.6	1.8	2.3	2.7	3.2	3.6	4.6	5.5	6.4	7.4	8.3	9.2
26	.9	1.2	1.5	1.6	1.9	2.4	2.9	3.3	3.8	4.8	5.8	6.7	7.7	8.6	9.6
27	1.	1.5	1.5	1.7	2.	2.5	3.	3.6	4.	5.	6.	7.	8.	9.	10.
28	1.0	1.0	1.5	1.8	2.1	2.5	3.1	3.6	4.1	5.1	6.2	7.3	8.3	9.3	10.3
29	1.0	1.3	1.6	1.8	2.1	2.6	3.2	3.7	4.3	5.3	6.4	7.5	8.5	9.6	10.7
30	1.1	1.3	1.6	1.9	2.2	2.7	3.4	3.8	4.4	5.5	6.6	7.7	8.8	10.	11.1
31	1.1	1.4	1.7	2.	2.3	2.8	3.4	4.	4.6	5.7	6.8	8.	9.2	10.3	11.5
32	1.1	1.4	1.7	2.	2.4	2.9	3.5	4.1	4.7	5.9	7.1	8.3	9.5	10.6	11.8
33	1.2	1.5	1.8	2.1	2.4	3.	3.6	4.2	4.9	6.1	7.3	8.5	9.8	11.	12.2
34	1.2	1.5	1.8	2.2	2.5	3.1	3.7	4.4	5.	6.3	7.5	8.8	10.1	11.4	12.6
35	1.3	1.6	1.9	2.2	2.6	3.2	3.9	4.5	5.1	6.5	7.8	9.	10.4	11.7	13.

NUMBER OF CUBIC YDS. IN FOUNDATION TRENCHES, &c.—*Contd.*

Results in Cubic Yards and Decimals.

Length Trench.	WIDTH OF TRENCH.														
	inches.				feet.										
ft.	12	15	18	21	2	2½	3	3½	4	5	6	7	8	9	10
36	1.3	1.6	2.0	2.3	2.6	3.3	4.	4.6	5.3	6.6	8.	9.3	10.6	12.	13.3
37	1.3	1.7	2.	2.4	2.7	3.4	4.1	4.8	5.5	6.8	8.2	9.6	10.9	12.3	13.7
38	1.4	1.7	2.1	2.4	2.8	3.5	4.2	4.9	5.6	7.	8.4	9.8	11.2	12.6	14.
39	1.4	1.8	2.1	2.5	2.8	3.6	4.3	5.	5.8	7.2	8.6	10.	11.5	13.	14.4
40	1.4	1.8	2.2	2.5	2.9	3.7	4.4	5.1	5.9	7.4	8.8	10.3	11.8	13.3	14.8
41	1.5	1.9	2.2	2.6	3.	3.8	4.5	5.3	6.1	7.6	9.	10.6	12.1	13.6	15.2
42	1.5	1.9	2.3	2.7	3.1	3.9	4.6	5.4	6.2	7.7	9.3	10.8	12.4	14.	15.5
43	1.6	1.9	2.3	2.7	3.1	3.9	4.7	5.5	6.3	7.9	9.5	11.1	12.7	14.3	15.9
44	1.6	2.	2.4	2.8	3.2	4.	4.8	5.6	6.5	8.1	9.7	11.3	13.	14.6	16.2
45	1.6	2.1	2.5	2.9	3.3	4.1	4.9	5.8	6.7	8.3	9.9	11.6	13.3	15.	16.6
46	1.7	2.1	2.6	2.9	3.4	4.2	5.1	5.9	6.8	8.5	10.2	11.9	13.6	15.3	17.
47	1.7	2.1	2.6	3.0	3.4	4.3	5.2	6.0	7.0	8.7	10.4	12.1	13.9	15.6	17.4
48	1.8	2.2	2.7	3.1	3.5	4.5	5.3	6.2	7.1	8.9	10.6	12.4	14.2	16.	17.8
49	1.8	2.2	2.7	3.1	3.5	4.5	5.4	6.3	7.3	9.1	10.8	12.7	14.5	16.3	18.1
50	1.8	2.3	2.7	3.2	3.6	4.6	5.5	6.4	7.4	9.2	11.1	12.9	14.8	16.6	18.4
51	1.9	2.3	2.8	3.2	3.7	4.7	5.6	6.5	7.6	9.3	11.3	13.1	15.1	17.	18.8
52	1.9	2.4	2.8	3.3	3.8	4.8	5.7	6.7	7.7	9.6	11.5	13.4	15.4	17.3	19.2
53	1.9	2.4	2.9	3.4	3.9	4.9	5.9	6.8	7.9	9.8	11.7	13.7	15.7	17.6	19.6
54	2.	2.5	3.	3.5	4.	5.	6.	7.	8.	10.	12.	14.	16.	18.	20.
55	2.	2.5	3.	3.5	4.1	5.1	6.1	7.1	8.2	10.2	12.2	14.3	16.3	18.3	20.4
56	2.	2.6	3.1	3.6	4.1	5.2	6.2	7.2	8.3	10.4	12.4	14.5	16.6	18.6	20.7
57	2.1	2.6	3.2	3.7	4.2	5.3	6.3	7.4	8.5	10.6	12.6	14.8	16.9	19.	21.1
58	2.1	2.7	3.2	3.7	4.3	5.4	6.5	7.5	8.6	10.7	12.8	15.	17.1	19.3	21.5
59	2.2	2.7	3.2	3.8	4.3	5.5	6.5	7.6	8.8	10.9	13.	15.3	17.4	19.6	21.9
60	2.2	2.7	3.3	3.8	4.4	5.5	6.6	7.7	8.9	11.1	13.3	15.5	17.7	20.	22.2
61	2.3	2.8	3.3	3.9	4.5	5.6	6.7	7.9	9.1	11.3	13.5	15.8	18.	20.3	22.6
62	2.3	2.8	3.4	4.	4.6	5.7	6.9	8.	9.2	11.5	13.7	16.	18.3	20.6	22.9
63	2.3	2.9	3.5	4.	4.6	5.8	7.	8.1	9.3	11.6	13.9	16.3	18.6	21.	23.3
64	2.4	3.9	3.5	4.1	4.7	5.9	7.1	8.2	9.5	11.8	14.2	16.5	18.9	21.3	23.6
65	2.4	3.	3.6	4.2	4.8	6.	7.2	8.4	9.6	12.	14.4	16.8	19.2	21.6	24.
70	2.6	3.2	3.8	4.4	5.2	6.5	7.8	9.	10.2	13.1	15.6	18.	20.8	23.4	26.
80	2.8	3.6	4.4	5.	5.8	7.4	8.8	10.2	11.8	14.8	17.6	20.6	23.6	26.6	29.6
90	3.2	4.2	5.0	5.8	6.6	8.2	9.8	11.6	13.4	16.6	19.8	23.2	26.6	30.	33.2
100	3.6	4.6	5.4	6.4	7.2	9.2	11.	12.8	14.8	18.4	22.2	25.8	29.6	33.2	36.8
200	7.2	9.2	10.8	12.8	14.4	18.4	22.	25.6	29.6	36.8	44.4	51.6	59.2	66.4	73.6

QUARRYING

In quarrying it is always considered advisable to obtain a vertical face to the quarry, the higher the better ; if the stone is detached at the ends with a natural cleavage, parallel with the face of the quarry, you will then be able to obtain an immense quantity of stone with a single hole. A block of freestone was detached from the face of a quarry at Sydney, about 150 feet long by 35 feet wide and 46 feet deep. A 5-inch hole was bored in the line of cleavage, about 75 feet from each end of the quarry, and 35 feet from its face, to the bed of the quarry, 46 feet in depth, into which was inserted 200 lbs. of blasting powder, filling up the lower 26 feet of the hole, the upper 20 feet tamped with dry clay. The mass, weighing about 15,000 tons, was moved forward about 18 inches, ready to be wedged and split up into blocks suitable for building. This hole was fired in three places by electricity, removing 75 tons of freestone for every lb. of powder exploded. By Sir F. Burgoyne's formulae for limestone, this would have required

$$353 = \frac{42{,}875}{32} = 1340\text{lbs.} \left\{ \begin{array}{l} \text{the quantity actually used was nearer} \end{array} \right\} 35\tfrac{1}{2} = \frac{1225}{6} = 204\text{lbs.}$$

In opening a quarry there is always a loss of labor in removing surface soil from the top, or at the foot of the quarry, down to the natural bed, sometimes both ; also in getting a vertical face and open ends for a really effective or great blast, so that an ordinary quarry does not pay for the first two or three months.

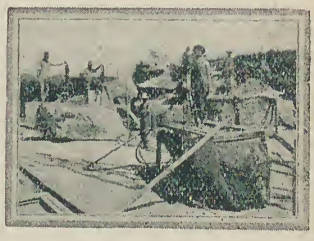
MEASUREMENT.

Although the stones are always quarried larger than the net size required, the latter only is paid for. If the stones are bevelled or angular, the largest dimensions square with each other are reckoned,

Soldier stones are building stones laid on the edge in contradistinction to stones laid on their natural bed as generally specified and carried out, but there are many exceptions to this rule because it has been found by actual experiment that some stones where it is usual to set all building stones on their edge (except cornices) are actually stronger on their edges than on their natural bed. The Sydney sandstone possesses similar properties, as proved by Professor Warren. The bank at the corner of George and Hunter-streets, the pilasters, 18¼ feet in height by about 2 feet square ; also the stones forming the pilasters opposite the granite columns of the Sydney Post Office, about 12 feet high, are Soldier stones.

QUARRYING BY CHANNELLING MACHINES.

In large marble quarries, West Portland steam channelling machines (with boiler attachment) are used for outlining dimension stone work with success.



Also in the Oolitic limestone quarry, at Bloomington, Ind., and the Columbian marble quarry, the rigid head and swivel head channellers for vertical and inclined cutting, excavate gutters 6½ inches wide to a depth of 14 and 15 feet, less width for less depth.

The wheel pits at Niagara Falls, 185ft. x 21 wide, 480ft. long, and great Canal of Lake Superior Power Co., outlining sides with smooth faces. Compressed air was the motive power to operate the channellers, the centre material was removed by explosives.

Steam Channeller, 1926, cutting sandstone gutter in State Quarry, Maroubra. Speed, 100ft. long x 6ft. x 3in. wide. Clear run, fixing rails and machine, &c., in position to be added.

The Swivel-Head Machine is more favoured in marble quarries, on account of its light weight, great cutting capacity and wide range of adjustability to follow the grain, and get best results in design from the coloured marbles, cutting straight faces to 20 feet if desired, and working up to 30 degrees inclines on cogged rails.

Marble Cutting, 15 to 20 feet x 3in. wide, per minute = 3 to 5 sup. feet guttering per minute.

Soft Sandstone and Limestone Cutting, 20 to 30 feet x 3in. wide ; 5 to 7ft. 6in., super feet per minute.

Where extensive blocks of Sandstone occur without beds, an undercutter or steam pick is used to cut horizontally.

A Track channeller to cut 120 lineal feet x 6ft. deep x 3in. wide in typical Sydney Sandstone in an 8 hours' shift, will cost from £850 upwards.

Track Channellers, swivel-head.

Foundations in Sydney Sandstone are cut out on boundary line of block by the aid of compressed air rock drills, at one third cost of hand guttering.

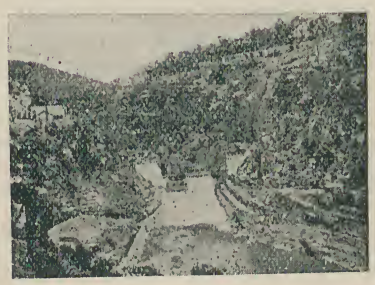
ROCK DRILLS.

These drills are directed by hand, and work with much vibration. The holes are kept free of dust and mud by a blast of air, led from the exhaust ports to the face of the bit through the hollow drill steel.

COMPRESSED AIR HAMMER DRILLS—ROTATORS.

D.P. 331. Price, Approx. £45.

All steel material. Weight 38 lbs. One-man self-rotating hammer drills, with steel retainer and automatic lubrication and requiring $\frac{7}{8}$in. solid or hollow drill steel. They are used for drilling work in highway or street construction, such as cutting trenches, deep drilling in quarries, block holing or horizontal toe hole work on high benches and railway approaches, also North Shore Bridge site, excavations, holes $1\frac{1}{2}$-20 ft. deep, drilled in 2 hours and blasted with compressed blasting powder. **Speed:** Can drill in Sydney Sandstone, holes 9 ft. per hour, 1in. dia., and 6ft. per hour, $1\frac{1}{4}$in. dia., under favourable circumstances.



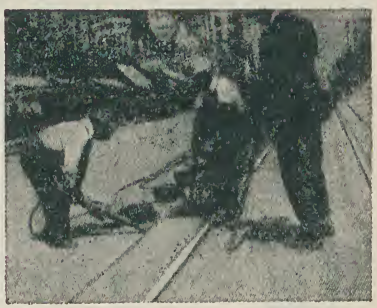
	£	s.	d.
3 drill operators at 22/– per day	3	6	0
Compressor attendant engineer	0	12	0
Gasoline per day, 15 gallons at 2/–	1	10	0
Add interest, renewals, wear and tear, 10 p.c.	0	12	0
Total cost per day for 160ft. drilled	£6	0	0

Or about 9d. per lin. foot.

From 20 to 80lbs. pressure of air required to work each drill. Cost in coal per drill—4 cwt.

Petrol driven compressor fuel, 15 gallons of petrol per day.

Pneumatic Spaders, for digging clay, &c., in culverts or other underground excavation work. A short light compressed-air tool, with spade handle and blade for confined elbow room spaces.



PNEUMATIC PERCUSSION PICKS. From light pick hammer, 16lbs., to heavy concrete breaker weighing 65lbs. Price, from £37/10/–.

Digging Spades, to fix in shaft, approx. £32/10/–.

DIRECTIONS FOR USING DRILLERS OR PERCUSSION DRILL TOOLS.

When the first steel has cut to its depth remove it—never allow your clearance to become too worn ; the following steel, when inserted, should fit the bottom of the hole so as not to jamb.

When a cavity or cross fissure is met with, crank the machine down to a short stroke until the bit or steel has started in the next ledge.

In drilling back holes through damp ground do not run the feed screw the full length. In working the drill back give a good supply of air to prevent the cutting from packing around the shaft of bit ; then knock back quickly till cleared.

In soft ground, where the debris soon clogs the bit, feed slowly, and lightly, and quickly tap with drill, using half head of air and a very long stroke to work debris and water into batter.

Experience has shown that the best quality of hose is most suitable, lasting, and least expensive. For steam hose, marline wound, being cooler to handle than metal winding. Half round wire is recommended for air hose, as the flat surface will not cut the rubber, and prevents kinking.

Flexible metallic tubing is specially made for heavy wear.

For prices of above. *See* India-rubber.

EXPLOSIVES

BLASTING AND EXPLOSIVES.

Murrumbidgee Dam Construction.

Prices liable to fluctuation.

For sandstone quarrying, where the mass of rock is not to be shattered, the slower explosive action of blasting powder is preferable.

In large blasts, chambering for the concentrated charge of the powder is made by simply exploding a cartridge or two of gelignite at bottom of drill hole, and clearing out debris previous to charging. *See* under "Quarrying" for blasting powder required.

BLASTING POWDER, loose, 11½d. per lb. 5lb. bags, 53/6 per 50lbs.

COMPRESSED BLASTING POWDER.—This is now much used in sewer work, and is compressed by powerful hydraulic presses into Pellets, 1in., 1⅛in., 1¼in., and 1⅜in. diam., by about 2½in. long, with a hole through the centre for the fuse. Price, 1/- per lb. The advantage said to be :—

> A greater amount of powder in a smaller space, and consequently a smaller bore hole is required and quicker charging of holes.

HIGH EXPLOSIVES per 50lb. cases.

Gelatine Explosives, by reason of their plasticity and greater power and water-resisting qualities, are more suitable and economical than Dynamite, and can be recommended for all ordinary rock-blasting purposes, pit-sinking, tunnelling, quarrying, metalliferous mining, limestone blasting, submarine blasting, etc., and are unaffected by water.

HIGH EXPLOSIVES.

(Per case of 50lbs.) (Prices uncertain.)

Blasting Gelatine	72/–	Gelignite, 40% S.N. ...	52/6
Gelatine Dynamite, S.N.	65/6	A.N. Gelignite, " 40 " ...	48/6
A.N. Gelatine Dynamite, " 75 "	55/6	Samsonite, No. 3 ...	54/–
Gelignite, 60% S.N. ...	59/6	Saxonite	46/6
A.N. Gelignite, " 60 " ...	50/–	Stonobel	46/6
Ardeer Gelignite, No. 2 ...	62/–	Quarry Monobel ...	44/6
Gelignite, 50% S.N. ...	56/–	A2 Monobel	44/–
A.N. Gelignite, " 50 " ...	49/6	Ligdyn 40%	47/–

BLASTING POWDER.

Curtis's & Harvey's—		
50lb. cases (bulk)	53/6	per case
50lb. „ (5lb. bags)	57/6	„ „
Hall's Compressed Cartridges	61/–	„ „

(50lb. cases)

RACK-A-ROCK.

Solid in 80lb. cases, liquid in 20lb. tins, /9 to /10 per lb.
Fuse Lighters, 3 minutes 9/– per 100, 2mm., 8/–.

DETONATORS.

No. 6, 2/6 per 100 ; No. 7, 3/2 per 100 ; No. 8, 3/9 per 100.

THISTLE No. 6 ELECTRIC DETONATOR AND FUSES.

	4ft. 4in.	6ft.	8ft.	10ft.	12ft.	20ft.	40ft.
Wires							
Per 1000 ...	11/8/–	12/1/–	13/5/–	14/9/–	15/13/–	20/14/–	32/14/–
Per 100 ...	23/6	25/–	27/6	30/–	32/6	42/6	66/6

SAFETY FUSE, per Coil.

Case 300 Coils.

" Thistle " Blue Sump, 8½d. ; Bickford's Double Tape No. 9, 11½d. ; Nobel's Double Tape, No. 12, 11½d.

Smaller lots, 1d. extra.

BLASTING.

Blasting.—One lb. of the best blasting powder will remove from three to six perches of sandstone, or from three to six tons of bluestone, granite, &c., if used in the usual way ; the powder is most effective if the line of resistance (the distance from the hole to the face of the rock) does not exceed one-half the depth of the hole, the ends being open or free.

The old method left many latent wasteful cracks in stone that opened out with exposure. The channelling machine followed with plugs and feathers for cross cutting into blocks that fit a 1½in. drill hole, makes modern quarrying methods so sure and saving.

Various kinds of Exploders are made, small and portable, and about 20lbs. each.

Exploder, capacity 10 holes, £6 ; capacity 20 holes, £8.

All directions for charging, arrangement and testing of wires, and firing with above are printed and accompany machines, and should be followed minutely to detail, to save accident and ensure success.

COST OF DRILLING BY HAND JUMPER.

Basis—Labor, 2/6 per hour.

Blasting Powder required for different sizes holes, &c. :—

Diam. of Hole. Inches.	Powder in 1 foot. Lbs.	Depth for 1lb. Powder Feet decimals.	Cost of Drilling, &c., per foot By Hand Jumper Shale	Sandstone.	Bluestone
			s. d.	s. d.	s. d.
1½	0.71	1.41	1 3	1 6	2 10
2	1.26	0.80	1 6	1 10	3 6
2½	1.98	0.51	1 10	2 3	4 6
3	2.83	0.35	2 4	3 6	5 8
3½	3.85	0.26	2 10	3 9	6 8
4	5.03	0.20	3 2	4 6	7 8
4½	6.36	0.16	3 9	5 6	9 9
5	7.86	0.13	5 0	7 0	12 9
6	11.31	0.09	6 10	10 0	19 0

The last column includes labor, sharpening jumper, and fuse in charging and tamping per foot for the first 6ft. ; for the next 10ft. add one-half per foot, and from 16 to 26ft. double. For the first 6ft. one man can manage the drill ; from 6 to 16ft., two men, and from 16 to 26ft., three men are required. If only one size of drill is used—say 4in. in diameter, it will wear away to 3½in. before it is down 20ft., even in the soft freestone of the coal measures, as at Sudney and suburbs.

The hardness of sandstone varies even in the same quarry, but the above table is for the average yellow block Pyrmont stone. In surface sewer excavation I have known a 5ft. hole x 1½in. dia. at surface drilled with hand jumper in 30 minutes, with only three sharps. At 30ft. under surface the same sizes hole took two hours, with 10 sharps. A careful personal inspection and trial holes on site are necessary for safe tendering. Some sandstone is called white metal.

Machine drilling, *see* EXCAVATOR.

ELECTRIC SHOT FIRING.

Firing by electricity.—In firing holes simultaneously, a complete circuit must be made with the insulated wire, and wherever the wires are joined, the surfaces must be scraped clean with a pocket-knife. **Safety First.**—The battery must be connected by the man that charges the holes, if any holes misfire, the battery must be disconnected before approaching site.

I have fired two 4-inch holes, containing 66 and 34lbs. of blasting powder respectively, 80 yards from charge, removing 900 tons of Sydney freestone with Exploding Battery. I have also fired with success five holes along the cleavage simultaneously, the twin cable of holes being 30 yards only, and the three wires joining the five charges, about 11 yards each, removing 4000 tons sandstone at Pyrmont, Sydney.—C.E.M.

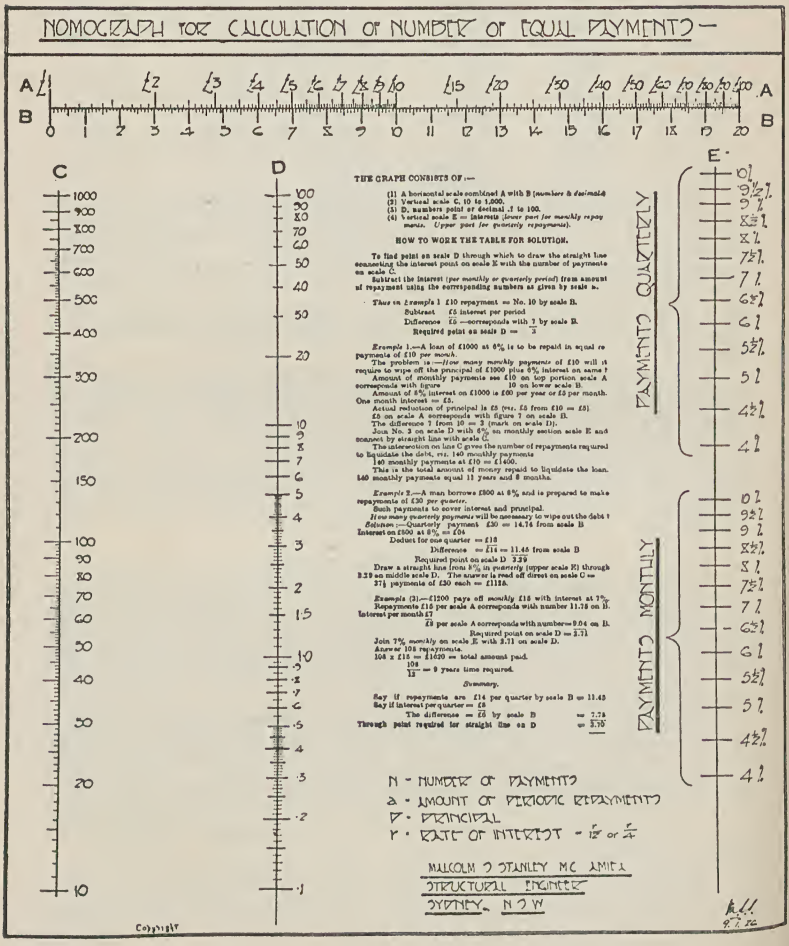
The above 8 feet from the face, tight ends, but on good " pug " bed 4 inches thick.

The largest hole in centre of line, removing block 9 inches forward at centre straight out in the form of a **V.**

BUILDING LOANS ON TIME PAYMENT.

The Purchase at Various Interests.

ESTIMATOR FOR SALES


NOMOGRAPH FOR CALCULATION OF NUMBER OF EQUAL PAYMENTS —
A
B
C
D
E
PAYMENTS QUARTERLY
PAYMENTS MONTHLY
THE GRAPH CONSISTS OF —
(1) A horizontal scale combined A with B (numbers & decimals)
(2) Vertical scale C, 10 to 1,000.
(3) D, numbers point of decimal .2 to 100.
(4) Vertical scale E = interests (lower part for monthly repay ments. Upper part for quarterly repayments).
HOW TO WORK THE TABLE FOR SOLUTION.
To find point on scale D through which to draw the straight line connecting the interest point on scale E with the number of payments on scale C.
Subtract the interest (per monthly or quarterly period) from amount of repayment using the corresponding numbers as given by scale B.
Thus on Example 1 £10 repayment = No. 10 by scale B.
Subtract £5 interest per period
Difference £5 —corresponds with 7 by scale B.
Required point on scale D = 2/3
Example 1.—A loan of £1000 at 6% is to be repaid in equal re payments of £10 per month.
The problem is —How many monthly payments of £10 will it require to wipe off the principal of £1000 plus 6% interest on same ?
Amount of monthly payments see £10 on top portion scale A corresponds with figure 10 on lower scale B.
Amount of 6% interest on £1000 is £60 per year or £5 per month.
One month interest = £5.
Actual reduction of principal is £5 (viz. £5 from £10 = £5)
£5 on scale A corresponds with figure 7 on scale B.
The difference 7 from 10 = 3 (mark on scale D).
Join No. 3 on scale D with 6% on monthly section scale E and scanner by straight line with scale C.
The intersection on line C gives the number of repayments required to liquidate the debt, viz. 140 monthly payments
140 monthly payments at £10 = £1400.
This is the total amount of money repaid to liquidate the loan.
140 monthly payments equal 11 years and 8 months.
Example 2.—A man borrows £800 at 8% and is prepared to make repayments of £30 per quarter.
Such payments to cover interest and principal.
How many quarterly payments will be necessary to wipe out the debt ?
Solution :—Quarterly payment £30 = 14.74 from scale B
Interest on £800 at 8% = £64
Deduct for one quarter = £16
Difference = £14 = 11.45 from scale B
Required point on scale D 3.29
Draw a straight line from 8% in quarterly (upper scale E) through 3.29 on middle scale D. The answer is read off direct on scale C = 27¼ payments of £30 each = £1118.
Example (3).—£1200 pays off monthly £16 with interest at 7%
Repayments £16 per scale A corresponds with number 11.76 on B.
Interest per month £7
£9 per scale A corresponds with number= 9.04 on B.
Required point on scale D = 3.71
Join 7% monthly on scale E with 3.71 on scale D.
Answer 108 repayments.
108 x £16 = £1620 = total amount paid.
108/12 = 9 years time required.
Summary.
Say if repayments are £14 per quarter by scale B = 11.45
Say if interest per quarter = £6
The difference = £8 by scale B = 7.75
Through point required for straight line on D = 3.70
N = NUMBER OF PAYMENTS
a = AMOUNT OF PERIODIC REPAYMENTS
P = PRINCIPAL
r = RATE OF INTEREST = 1/12 or 1/4
MALCOLM J STANLEY MC AMIS
STRUCTURAL ENGINEER
SYDNEY. N S W
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The graph illustrates a very simple solution for determining the number of equal payments which will wipe out the principal and interest on a loan.

The interest may vary from 4 per cent. to 10 per cent. and the repayments may be made monthly or quarterly.

HOW TO WORK THE TABLE FOR SOLUTION.

To find point on scale D through which to draw the straight line connecting the interest point on Scale E with the number of payments on scale C.

Subtract the interest (*per monthly or quarterly period*) from amount of repayment using the corresponding numbers as given by scale B.

A loan of 1000 at 6% is to be repaid in equal repayments of £10 per month.

The problem is :—*How many monthly payments* of £10 will it require to wipe off the principal of £1000 plus 6% interest on same.

Amount of monthly payments see £10 on top portion scale A. corresponds with figure 10 on lower scale B.

Amount of 6% interest on £1000 is £60 per year or £5 per month. one month's interest = £5.

Actual reduction of principal is £5 (viz. £5 from £10 = £5).

£5 on scale A corresponds with figure 7 on scale B.

The difference 7 from 10 = 3 mark on scale D.

Join No. 3 on scale D with 6% on monthly section scale E and connect by straight line with scale C.

The intersection on line C gives the number of repayments required to liquidate the debt, viz. 140 monthly payments.

This is the total amount of money repaid to liquidate the loan.

140 monthly payments = 11 years and 8 months.

140 monthly payments at £10 = £1400.

Thus in Example 1, £10 *repayment = No.* 10 *by scale B.*

Subtract £5 *interest per period.*

Difference £5—*corresponds with* 7 *by scale B.*

Required point on scale D = 3.

Example 2—A man borrows £800 at 8% and is prepared to make repayments of £30 *per quarter.*

Such payments to cover interest and principal.

How many quarterly payments will be necessary to wipe out the debt:

Solution :—Quarterly payment £30 = 14.74 from scale B.

Interest on £800 at 8% = £64.

Deduct for one quarter = £16

Difference : = 14 = 11.45 scale B.

Required point on scale D, = 3.29.

Draw a straight line from 8% in quarterly (upper scale E) through 3.29 on middle scale D.

The answer is read off direct on scale C.

= 37½ payments at £30 each = £1125.

Example 3—£1200 pays off monthly £15 with interest at 7%,
Payments £15 per scale A corresponds with number 11.75 on B.
Interest per month = £8 per scale A corresponds with number = 9.04 on B.
Required point on scale D = 2.71.
Join 7% monthly on scale E with 2.71 on scale D.
Answer 108 repayments.
108 x £15 = 1620 = Total amount paid.
$\frac{108}{12}$ = 9 years time required.

Summary—

Say if repayments are £14 per quarter by scale B = 11.45
Say if interest per quarter 8
The difference = 6 by scale B = 7.75
Through point required straight line on D. = 3.70

ELECTRICAL

DUCON ELECTRIC ARC WELDERS.

The main features of these Arc Welders are the Hand high operation level, the rapid arc pick-up and even arc temperature, vertical or horizontal operation of units, stable welding arc, robust construction, portability and facility for packing and transport, split hair control of output. This arc welder is built in excess of the requirements of the welder specification of the B.E.S.A. The distributors, Smith & Gluyas Pty Ltd., guarantee the Ducon Arc Welder for one year against defective material and manufacture.

There are 5 distinct types, namely :—

150 amps { BT type :—used for medium work, priced at £52/10/–.
BTG3 type :—used mainly for sheet metal work, priced at £67/10/–.

200 amps { CT type :—used mainly for heavier work, priced at £67/10/–.
CTG3 type :—used mainly for heavier work, priced at £87/10/–.

350 amps { DT type :—extra heavy duty, i.e., continuous operation, priced at £100/10/–.

The above are complete with accessories, and are made in Australia. Prices for Electrodes may be obtained on application to Smith & Gluyas Pty. Ltd.
See Agents advt., p. 32.

ELECTRICAL TERMS.

Current denotes **flow** of electricity along a conductor.

Volt is the unit of **Electro motive force,** E.M.F., the force or pushing power, or difference of potential.

An electro motive force which would cause a current of one ampere to flow through a resistance of one ohm.

Ampere.—The quantity of current flowing through, or the rate at which electricity passes a given point in the conductor.

Watt, or **Volt-Ampere,** signifies the value of output being amperes x volts. Unit for measuring power.

K.W. or **Kilowatt** = 1000 watts, 1000 watts = 1 unit. Unit is the gauge by which electricity is charged. 1 watt = 1 volt x 1 ampere Board of Trade unit = 1000 watts per hour.

Ohm.—The practical unit of resistance in the conductor tending to impede the flow of current.

Megohm = 1,000,000 ohms.

Resistance.—That property of an electric conductor by which it opposes the passage of an electric current.

Insulator.—All substances which resist the passage of electric current are termed insulators, such as glass, slate, marble, vulcanite, mica, indiarubber and porcelain.

Positive is signified by the sign plus and **Negative** by minus .

One Horse-power = 33,000 foot pounds per minute = 746 watts.

Brake Horse-power = the available H.P. at the pulley.

Electric H.P. (a rate of electrical performance) = 746 watts.

AKW = 1.34 British horse power.

R.P.M. revolutions per minute.

Prefix "**Milli**" = 1000 part. "**Micro**" = the millionth part.

"**Kilo**" = one thousand times. "**Meg**" = one million times.

A.C.—Alternating current—an abb. expressing a current having a periodical change in direction.

D.C., Direct Current (also called Continuous Current), a current flowing in the same direction only.

C.P.—Candle-power. 16 C.P. consumes with carbon filaments 56 watts (3.5 watts per C.P.). Metal filaments, 18.4 watts, 1.15 watts per C.P.

C.P. Candle Power. These terms by which the luminosity of a lamp as stated.

Present customs rates lamps in watts, 25, 40, 60, 75, 100 and up to 1500 watts.

Up to 100 watts the C.P. would approx. 1 per watt.

In **the high wattage lamps** the C.P. would be nearer two per watt hence the term half watt.

"**Candle Foot**" = a unit of illumination equal at a distance of one foot to that which is given out by a standard British candle.

D.P. Switch.—An abb. for double-pole switch.

S.P. Switch.—For single pole.

Fuse.—An incombustible box containing a safety fuse.

Holophane.—A glass with a tentaform external surface employed for the better diffusion of the light emerging from an enclosed source.

Short Circuit.—A connection between two parts of a circuit which connection is of low resistance compared to the intercepted portion of a shunt or by-path.

Tension-High.—A term not properly used, signifying electro-motive intensity, also electro-motive force, which should be designated by their proper terms.

Transformer.—An induction coil by which a primary current of high initial electro-motive force is made to produce a secondary current of low initial electro-motive force.

Low Voltage.—Any voltage normally not exceeding 250 volts.

Medium Voltage.—Any voltage normally exceeding 250 volts and normally not exceeding 650 volts.

High Voltage.—Any voltage normally exceeding 650 volts.

A useful example showing how to calculate cost of electricity consumed :—

All electric apparatus has a fixed rating, shown in watts, viz. : a 50 candle-power lamp consumes 60 watts **per hour** (electrical ratings are usually shown or reckoned at per hour consumption).

— 60 watts per hour, current at 4½d. per 1000 watts or 1 unit = $\frac{4\frac{1}{2} \times 60}{1000}$ = .27d.

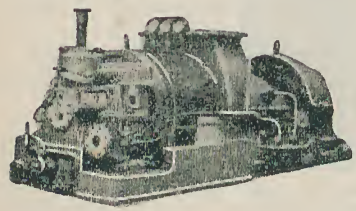
ELECTRIC MOTORS.

Direct Current. 140, 240, 480 Volts, D.C.			Alternating Current. Three Phase A.C.		
H.P.	r.p.m. Speed	Motor, Starter Pulley & Rails £ s. d.	H.P.	Speed r.p.m.	Price Complete £ s. d.
½	1450	14 15 0	½	1400	7 0 0
1	1450	20 0 0	1	2800	8 15 0 No starter
2	2000	29 0 0	1	1400	9 5 0 ,, ,,
3	1500	34 0 0	1	950	11 0 0 ,, ,,
	480 volts D.C.		2	1425	11 5 0 ,, ,,

ELECTRIC MOTORS

		Price complete						
				3	1425	18 0 0	with	starter
				5	1425	21 10 0	,,	,,
3	1550	34	0 0	7½	1440	26 0 0	,,	,,
5	1350	42	0 0	7½	950	34 5 0	,,	,,
5	1075	47	0 0	10	1440	29 0 0	,,	,,
7½	1075	74	0 0	10	710	40 0 0	,,	,,
15	1050	100	0 0	15	950	42 0 0	,,	,,
				20	970	52 0 0	,,	,,
				25	970	59 0 0	,,	,,

THE BROTHERHOOD STEAM TURBINE.



500 b.h.p. Power, with power-producing reducing valves.

The motor in casing 3 ft. long, developing 4,500 h.p. at 3,000 revolutions per min.

Extract from Manufacturer's Printed Book.

Comparative Cost of Working. Steam for work plant needing 15,000 lbs. of steam an hour, added quantity, at 30 lbs. per square inch, from Lancashire type of boiler which required about 2,000 lbs. of coal an hour costing, say, 35/–, and using power added up = 300 b.h.p. of electrical driven 200 k.w. Power is hardly likely to be bought or generated on a moderate scale for less than ¾d. a unit, say ½d. for b.h.p. hour. The cost of power will therefore be about 12/6 per hour.

Now if steam be generated in a high pressure boiler with a moderate degree of superheat and used in a Turbine which delivers the steam at 30 lbs. per square inch, the turbine will develop, if required, about 350 h.p., say 230 k.w.

By increasing by about 5 per cent. the coal hitherto used to produce low pressure steam only, the whole cost of power will be saved, and in the case cited above, the saving over a year of only 3,000 hours will be £1,500, or thereabouts ; in other words : " The power costs almost nothing."

A Turbine runs without perceptible noise and entirely without vibration.

Momentary variations in speed are impossible, owing to the immense amount of energy stored up in the rotating discs, for instance, a 500 h.p. Brotherhood Turbine possesses over 10 times the flywheel effect which can be obtained with an ordinary 7 ft. flywheel running at 250 revs. per minute.

PELTON WATER WHEELS.

Head of Water, 90ft.

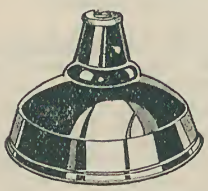
Size of Wheel in.	H.P.	Cubic Feet.	Price approx. only Unmounted £	Weight cwt.
30	9	73	110	25
36	14	109	130	38
42	19½	150	180	62
48	25	196	220	80
60	40	314	270	95

ELECTRIC LIGHTING

Indoor lighting requires according to purpose from 2 to 5 candle power per 10 square feet.

Outdoor lighting, ditto, ½ to 2 candle power per 10 square feet.

Indirect and **semi-indirect lighting** is becoming popular owing to the softness and better diffusion of light.



Flood lighting by powerful reflectors directed at close distances for illuminating objects within, and surfaces of buildings and foliage without, to a concentrated portion is very effective, by using tinted electric light bulbs the colour effect is varied.

See FLOOD LIGHTING SECTION.

Cost.—The electric installation is usually quoted for at **per point.**

Prices, according to system adopted, range from 25/– enclosed wiring in plain conduit to 35/– per point in screwed conduit tubes, including plain cord pendants and lamps and shade.

Power points for heating apparatus, fans, &c., from 40/– per point, including switch, plugs. (Award Wages, Fitters, 2/4½ per hour.)

COUNTRY LIGHTING.

Small sets, for 20 lights, from £80.

Electric light bulbs, from 1/3 each upwards.

SEMI TRANSPARENT PORCELAIN GLOBES AND BOWLS.

For ceiling reflectors or pendants. Prices range from 25/– upwards.

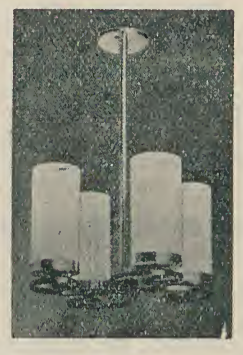
Plain pendant, with ceiling rose, flexible cord, shade and holder,	s.	d.
each	6	0

Counter balance pendant, ceiling rose, flexible cord, fitted with—

	s.	d.
10in. opal shade and holder, each, from 1/–, enam., 1/–,		
12in. ... ... each	1	6
3 light fitting only, each	36	0
3 light fancy do. do., each	40	0
3 light fancy pendants, each, from ... ... 50/– to	150	0

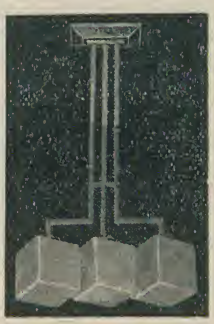
All fittings over 2lbs. weight must have auxiliary support.

Porcelain Switch Fuses 15 amp., 500v., each 2 6



Tumbler Switches Ring grip, 5 amp., 21.1 way, doz. ...	8	6
22.2 way, each	1	6
Ceiling Switches, Ring grip, 64 2 way, each	4	0
Switch Boards B & H 10 amp., s. cir.	5	6
20 amp. single circuit, 7/8, 2 c.	11	9
Reflectors Silver Green angle, each	9	6
3 circuit 20/6, 4 cir. 24/–, 10″ Silvered Wall, each ...	7	0

4 Light Pendant, £4/–/–.



ELECTROLIERS.

Fancy globes, 15/– to 25/–.

	£	s.	d.
3 light plain brass, 4ft. stem, each, from	3	5	0
2 light fancy do. each, from ... ... £2 to	4	0	0

For copper, bronze, or oxydised silver finish, add 25 per cent.

WALL BRACKETS.

	s.	d.
9in. plain swan neck, ½in. tube, each	3	6
12in. fancy, plain brass, ½in. from	9	0
2 light do. do. each, from	20	0

TABLE STANDARDS AND NEWEL LAMPS.

	£	s.	d.
12in. plain standard, with gallery shade and holder, each, from	0	18	6
Fancy do. fancy shade and holder, each, from ...	2	10	0
Newel standard, 1 light, 4ft. p. brass, 1in. stem, each £4 10 0 to £8	0	0	

MATERIAL AND PRICES FOR GENERAL HOUSE WIRING.

Switchboard Single Circuit, 7/6 each.

⅝in. Conduit, Plain, 11/– per 100ft.

¾in. Screwed Conduit, 15/– per 100ft.

⅝in. Elbows (Fittings), 2/– per doz ; **⅝in. Tees,** 2/6 per doz. ; **⅝in. screw Couplings,** 2/3 per doz. ; **⅝in. Bends,** 5/3 per doz.

Clouts, 1/– per packets ; **¾in. Crampets,** 4/– per gross ; **⅝in. Crampets,** 2/9 per gross., gal. 3/6.

⅝in. Earth Clips, 1/7 per doz. ; **¾in. Earth Clips,** 1/8 per doz.

¾in. Bell Mouth, 2/9 per dozen ; **1½in. Button Insulators,** 1/1 per dozen ; **3½in. Wood Block,** 14/– per gross.

Ceiling Switches, 3/9 to 7/– each ; **Tumbler Switches,** 1/– to 2/– each ; **Porcelain Switches,** 1/8 each.

Shades, Opal, 9d. each ; **Lamp Holders,** 8d. each ; **Ceiling Roses** 8d. each ; **Lamps,** from 1/3 each.

HEATING APPARATUS.

	£	s.	d.
Glow Radiators, cast iron, black Japan finish—			
2 light, £2 ; 3 light, £3 ; 4 light	4	0	0
Ornamental hammered copper, 2 light, £4 ; 3 light, £4/10/– ;			
4 light	5	0	0
Laundry Irons, 7lb., with flexible cord, 100-240 bolts, each £1/5/– to	2	7	6
Soldering Irons, with 4 detachable copper bits, each ⅜in., ½in., ⅝in., 1⅛in. ... ... £3/7/6 to	3	17	6
Kettles, polished copper finish ... ... 2 pint 43/6 ea.			
3 ,, 47/6 ,,			
Glue Pots, for workshop ... ... 2 pint 58/6 ,,			
3 ,, 65/– ,,			

HEATING APPARATUS

	£ s. d.
Electric Grillers, prices according to size, each, from ...	4 12 6
Electric ovens, 8-10 persons, with 3-ring top	15 0 0
Hot Plates	0 17 6
Toasters	2 15 0

ELECTRIC FANS.

	£ s. d.
Desk or Wall	
200-250 volts, 12in., each £6/10/– 16in., each ...	8 5 0
Oscillating, add 25 per cent.	
Ceiling Fans—	
Four blade, Japan finish, 56in. sweep	5 5 0
Ditto, copper, oxydised, 56in. sweep	6 0 0
Speed regulators for ceiling fan, 6 speed, each ...	1 5 0
Sewing Machine Motors (Western)	5 15 0
Vacuum Cleaners, with Motor Driven Brush	18 17 6
Exhaust Fans, with **Motor attached—**	
12in. blades, air displacement 1100 c. ft. per min. ...	13 10 0
18in. blades, air displacement 2200 c. ft. per min. ...	19 10 0
24in. blades, air displacement 4000 c. ft. per min. ...	36 0 0
36in. blades, air displacement 12,000 c. ft. per min. ...	50 0 0
Water Motor Fans, 12in. blades, 30lb. sq. inch pressure, each	5 0 0

ELECTRIC BELLS—For House or Factory Use.

	Per point fixed. £ s. d.
All wires cased in zinc tubing, with indicator	1 5 0
With fixed wall or hanging pear, best quality	1 17 6

BELLS.

	£ s. d.
Accessories—	
3in. gong, ordinary quality, 3/6 ; best quality, 5/– ; 6in. each	1 0 0
Continuous action, for alarm, 8in. gong, each ...	4 0 0
Burglar Alarm, window and door contacts, each ...	0 2 6
Ditto, gate and outdoor use, watertight, each ...	0 3 6
Portable bell sets, with flexible cord, for sick rooms, each	1 10 0

TELEPHONES AND TELEPHONETTES.

	£ s. d.
Internal Office, fixed transmitter and separate receiver, to work up to ¼ mile line, battering ringing, each ...	2 7 6
House Telephone, fitted with combination receiver and transmitter from each	0 17 0
Ditto. do., fixed transmitter, kitchen type	0 11 0

The above may be used in conjunction with existing bell line.

LONG DISTANCE TELEPHONE.

Wall Pattern.	£	s.	d.
Half to 2 miles, two magnet generator	2	10	0
Ditto, 2 to 100 miles, as used by Government	5	0	0
C Batteries, for telephones, "leclanche," complete, per cell	0	2	6
Mining telephones, watertight and gas proof case	9	10	0
Inter-communication system for warehouses, fitted complete with switches, per telephone	3	10	0

Floor Polishing Machine. For operating single phase floor polishing machines, a charge of £1 is made for connection and disconnection, and power at cost of 6d. per unit for less than one month's use.

CONDUIT FITTINGS.

Plain and Galvanised.

Per Gross.

Couplings		½in. & ⅝in.	¾in.	1in.
	Plain	24/3	30/–	60/–
	Galvd.	28/9	35/–	67/6
Elbows	Plain	27/6	35/–	95/–
	Galvd.	32/9	41/–	105/–
Tees	Plain	36/6	42/–	140/–
	Galvd.	42/–	52/–	160/–
Inspection Elbows	Plain	45/3	65/–	227/6
	Galvd.	52/–	71/6	260/–
Inspection Tees	Plain	58/6	80/–	227/–
	Galvd.	66/9	88/–	260/–

JUNCTION BOXES.

F.G.S.	⅝″	Per dozen ¾″	Per dozen 1″
2 Way Plain	9/9	10/3	22/– doz.
3 ,, ,,	10/–	10/6	24/– ,,
4 ,, ,,	10/9	11/–	26/– ,,
2 ,, Screwed	8/10	9/9	18/11 ,,
3 ,, ,,	9/3	9/10	20/4 ,,
4 ,, ,,	9/9	10/7	22/6 ,,
2 ,, Galvd. (screwed)	10/7	11/6	21/1 ,,
3 ,, ,,	11/–	12/3	22/6 ,,
4 ,, ,,	12/–	12/11	25/– ,,

C.M.A. WIRES, CABLES AND FLEXIBLES.

The following list of fluctuating prices for the trade on 1st April 1938. Labour fixing at 2/6 per hour net.

(per 100 yards)

Size Conductor.	600 Meg.	Weather-proof 600 Meg.	Taped & Lead Covered. (600 meg.) single.	Twin Lead 600 Meg.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1/.044	10 0	18 0	1 9 0	2 4 0
1/.064	15 7	1 7 11	1 17 7	3 6 9
7/.029	1 3 4	1 17 2	2 10 3	4 16 9
7/.044	2 4 0	3 2 6	4 10 0	8 1 6
7/.064	4 1 0	5 3 6	7 13 0	13 16 0
19/.044	5 18 0	6 10 6		
19/.052	7 15 6	8 10 0		

Flat Cab Tyre Twin 600 Meg.	
1/.044	2 3 6
3/.929	2 16 3
1/.064	3 0 9
3/.036	3 8 0

Glace Cotton Braided Flexibles. 600 Meg.				C.T.S. Flexibles		
Conductor	Twin Twisted	Twin Cir. with Filling	3 core Circ. with Filling		2 core	3 core
	£ s. d.	£ s. d.	£ s. d.		£ s. d.	£ s. d.
23/.0076	1 3 3	1 7 9	3 2 6	23/.0076	1 17 8	4 1 5
40/.0076	1 11 5	1 16 2	4 2 6	40/.0076	3 10 0	5 4 11
70/.0076	2 11 3	2 15 3	5 9 5	70/.0076	5 17 2	7 2 10
				110/.0076	7 6 11	9 6 1

Wiring rule 421. " All plugs and sockets for new instalments to be interchangeable for builders and Contractors " Flood lighting.

Range Wiring approx. alone £3 10 0

Electric Storage water heaters £3 10 0

Alterations to Consumer's mains ... ... £2 to £2 15 0

Refrigerator Household type can be connected to ordinary power point.

Country Magneto Telephone for 10 miles distance for home and Factory use, 17/6 each.
Keeps Co., 305 Castlereagh St.

Electric Travelling Grab.
Crane, with 20 cubic feet grab. 18ft. radius. Free delivery Sydney, £1150.

Steam Travelling Grab Crane.
with 20 cubic feet Priestman's grab, 18 feet radius. £1350.

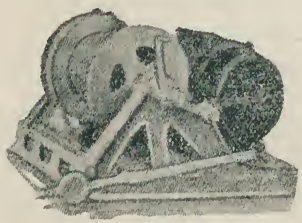
LITTLE GIANT ELECTRIC HAMMER DRILL.

Equipped with universal interchangeable motor for operating 220 or 110 volts. **Alternating** or **direct** current.

For **Drilling** in **Concrete** or **soft stone,** as well as light chipping of metals ; for preparing door and window openings for metal, wood, or other frames.

Equipment, 10 feet of cable. 2 drill ties, with holder and rotating wrench.

Comparison, holes drilled in 30 seconds to 40 minutes for the same job by hand. Price £35 approx.



HOIST, ELECTRIC DRIVEN.

Used for rapid hoisting of concrete.

Heavy duty type to eighth storey. Capacity 2000 lbs. at 300 ft. per minute.

Price from £85.

For fuller particulars and sizes, *see advt., page* 6.

ENAMELLED GRIP CONDUIT.

12′ 6″ lengths.
Except in short lengths of flat supplies 5′ 3″ or 6′ 3″ as requested.
Prices, May 1937.

Size and Description.	Broken Bundles Per 100 ft.
½″ Round Enamelled ...	11/3
⅝″ ,, ,, ...	11/–
¾″ ,, ,, ...	17/–
1″ ,, ,, ...	25/–
1¼″ ,, ,, ...	42/9
1½″ ,, ,, ...	55/3
2″ ,, ,, ...	73/3
⅝″ flat Enamelled 12′ 6″ lengths	13/9
⅝″ ,, ,, short lengths	14/3
¾″ flat Enamelled 12′ 6″ lengths	18/9
¾″ ,, ,, short lengths	19/3
½″ Plain Galvd.	20/6
⅝″ ,, ,, ...	21/–
¾″ ,, ,, ...	27/9
1″ ,, ,, ...	39/9
1¼″ ,, ,, ...	58/6
1½″ ,, ,, ...	80/–

WELDED SCREWED CONDUIT.

Size.	Black Enamelled. Feet per Bundle	Broken Bundles.	Galvanised. Broken Bundles.	Bundles or more.
$\frac{5}{8}$″	250	21/3	39/9	37/9
$\frac{3}{4}$″	200	26/–	47/–	44/–
1″	125	41/3	64/3	61/3
$1\frac{1}{4}$″	140	56/3	82/6	80/–
$1\frac{1}{2}$″	110	88/6	129/–	124/–
2″	70	135/–	190/6	182/6

Centerweight, complete, 2/3 ; Shot for Centerweight, 9d. per lb.

LAMP HOLDERS, per doz.

Cord Grip, Bayonet Cap, 7/6 ; **Batten Holder,** 9/3 ; $\frac{5}{8}$in. **Holders,** 8/3 ; $\frac{1}{2}$in. **Holders,** 8/3 ; $\frac{3}{4}$in. **Holders,** 8/6 ; **Key Holders,** 33/–.

BELL INDICATORS.

2 holes, 15/– ; 3 holes, 16/6 ; 4 holes, 21/– ; 5 holes, 23/– ; 6 holes, 26/6 ; 7 holes, 36/6 ; 8 holes, 37/6 ; 9 holes, 40/– ; 10 holes, 42/6 ; 12 holes, 48/–.

BELLS, BUZZERS AND PUSHES.

$2\frac{1}{2}$in. Bell, each 1/9 ; 3in. Bell, each 3/– ; Buzzer, each 3/6.
Pear Pushes, 9/–, Bell Transformers Bak., each 4/6.
Wall Plugs, 2/– each ; 2 pin plugs Bases, 14/– doz.

MARBLE SLABS FOR SWITCHBOARDS.

Polished Faces, Sawn Edges, $\frac{3}{4}$in. thick, 5/– per sq. ft.

SHADES, per doz.

9in. Opal, 5/6 ; 10in. Opal, 10/6 ; 9in. Enamel, 3/– ; 10in. Enamel, 9/6 ; 12in. Enamel, 16/6.

CEILING SWITCHES.

Combined Switch and Ceiling Rose, 3/3 each.
Ceiling Switch, 1 Amp. s. pole, 3/9 each ; 5 Amp., 2 way, 4/– each. Kerson 2 way, 3/3.

Flush Switches.

Tumbler Ring grip 5 Amp., 1 way, 18/– doz.

Rotary Snap Switches, Nickel, each.

3 Amp. **Non Indicating,** s. pole, 1/6 ; **Indicating,** s. pole, 1/8 ; **Non. Indic.,** 2 way, 3/6 ; 4 way, 5/6.
5 Amp. **Indicating,** D. pole, 3/10 ; 10 Amp., 4/6 ; 20 Amp., 9/– ; 30 Amp., 11/– ; 50 Amp., 19/–.
For **Porcelain Covers,** add 3d. to the cost of Nickel Covered Switches.

Tumbler Switches, 5 Amperes, per doz.

S. pole, Brass, 13/–; Porcelain, 22/–; 2 way Brass, 21/6; Porcelain, 30/–.

Le Clanche Cell Complete, 2/9.

Bell Wire, D.C.C., 4/6 per coil.

Silk Bell, Flexible, 20/– per gross yards.

Insulated Staple, 1/– per 100.

Presspahn Paper, Sizes from .008 to .040, 1/– lb.

Leatheroid, sizes from .008 to .145, 1/9 lb.

Varnished Cambric, size .007, 2/2 lb., .010, 1/9 lb.

Varnished Silk, size .003, 8/– lb., .005, 9/– lb.

Black Adhesive Tape, 2oz. coils, per lb. 2/3.

Pitch & Bitumen Tape, coils per lb. 2/–.

Burgess A. Batteries, for bell No. 6, 1.5 volts, for general service, 2/–.

Hot Shot Battery, 6 volts, for ignition purposes, 10/6.

FLOOD LIGHTING REFLECTORS.

16 " Parabolic " Aluminium Reflector, cast iron casing, for 500 watt, £10.

Ditto, sheet steel casing, £15.

X Ray Projector, with No. 800 X Ray Reflector, swivel and tilting base, 250 watt, £10.

BELLS, BUZZERS, ETC.

2½in. 1/C. Bells ... each	1/9	Bak. Presses ... doz.	7/6
Dux Bakelite Double Coil ea.	3/6	Bell Transformers Bak. ea.	4/6
Bak. Pear Pushes ... doz.	8/6	Bell Wire 20g. D.C.C. I.R. Coil	3/6

SPECIAL LINES.

To comply with New Regulations (Sydney County Council).

Earth Leakage Switches 25 amp. D.P. ... ... 40/– ea.
Standard A25ASP with Neut Link ... ... 33/6 „

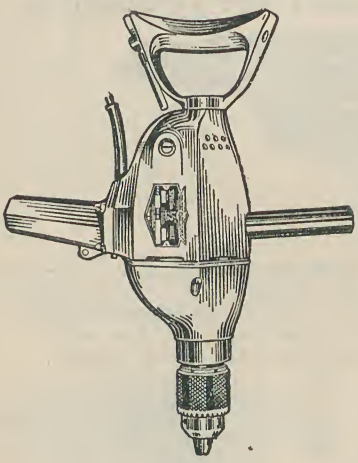
Connection Boxes D.P. Ageite Mains connection boxes ... 3/3 „
4 pole ... ... 4/6 „
DP Porcelain ... ... 3/3 „
Electric Range ... ... 4/6 „

Twin Flat Rubber Wire 600 cts—7/.036 ... £5/19/– per 100 yds.

All prices mentioned hereunder are approximate only.

Stocks now arriving have been purchased at increased rates due to the shortage of metals.

Write agents for firm quotations.



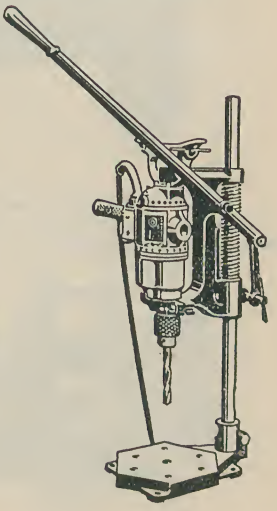
Contractors' ½in. **Special Electric Drill Ball bearing on shaft,** for drilling cast iron, brass, metal & wood up to 3½″ thick. Automatic release trigger switch in side handle with locking pin for optional use.

Capacity in steel, up to ½in., in wood to 1in., 400 r.p.m., length 17¼in. weight 13¼ lbs.

Complete with 3 conductor cable and 3 jaw chuck.

Price £16 10s. 0d.
Refer advt. page 16.
Voltages 32, 110, 220 250 A.C. or D.C.

CONTRACTORS' REVOLVING BENCH DRILL ON STAND.



½in. Drill with Special Bench Stand.

The handle has a 6 to 1 leverage the bracket can be raised or lowered on supporting columns.

Net weight, 105lbs.

Max. feed, 4″.

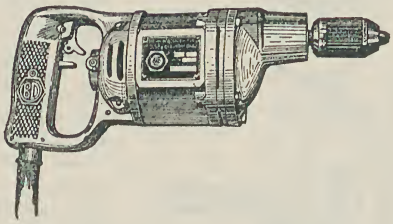
Price on application to Agents, refer advt., page 16.

All prices mentioned hereunder are approximate only.

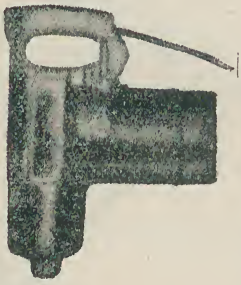
Stocks now arriving have been purchased at increased rates due to the shortage of metals.

Write agents for firm quotations. *See advt., page* 16.

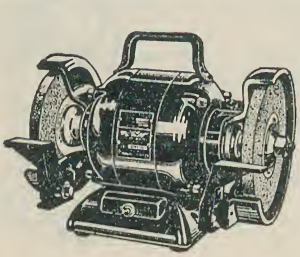
CONTRACTORS' ¼in. HEAVY DUTY DRILLING TOOL.



¼in. Heavy Duty Electric Drill, ball bearings.
For wood or steel up to ¼in. $\frac{9}{16}$″ rup.
No load speed, 2000 r.p.m., volts D.C., 32-110 or 220-250.
Length 13″, weight 9¼lbs., approx. Price, £12 10s. 0d.
For slower speed, high torque drill, see SCREW DRIVER.



Concrete Hammer, capacity 1in. hole; weight 26lbs., 1800 blows per minute, complete with 8ft., flexible cord and plug, switch in handle wrench and one drill steel. Price £65.



6in. Special Bench Grinder
Portable. For bench grinding, tool sharpening, overall 12½″ rubber feet and handle for carrying, weight, 30lbs., size of wheels 6″ dia. x ½″ face x ½″ hole.

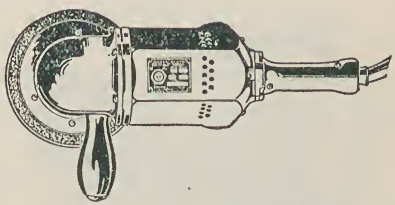
No load speed for 50 cycles, 3000 r.p.m., switch board in base, two tool rests. 2 grinding wheels, medium and fine. Approx. £31, A.C. single phase. Motor Volts. 110, 220, 250.

All prices mentioned hereunder are approximate only.

Stocks now arriving have been purchased at increased rates due to the shortage of metals.

Write agents for firm quotations.

7in. Super Service Sander Portable. For cleaning and levelling surfaces for finishing, grinding down rough spots on fine work. Diam. of sanding Discs, 7″. No load speed, 4,200 r.p.m. Weight 15¼ lbs., overall, 18⅝″. Approx. £24 10s.



BLACK & DECKER

4″, 5″, 6″ Portable Electric Grinder with cleanzing ventilating system for removing dust by forcing air straight through slots against the grinder.

For touching up metal bodies.

4″ grinder ¾″ x ½″, 5″ Approx. £12 10s.

	4″ Grinder	5″ Grinder	6″ Grinder
Wheel size ...	4″ x ¾″ x ½″	5″ x ¾″ x ½″	6″ x 1″ x ⅝″
No load speed ...	4800 R.P.M.	3800 R.P.M.	3300 R.P.M.
Net weight ...	12½ lbs.	15½ lbs.	23½ lbs.
Shipping weight	17 lbs.	28½ lbs.	35½ lbs.
Overall length	23″	23¾″	25½″

Voltages, A.C. or D.C. 110, 220, 250.

Further information, see advt., page 16.

Portable Electric Saw, 240 volts, U.C., weight 15 lbs., no load, speed 3,600 r.p.m., with 6in. diam. saw blade, maximum cut 1¾in. complete with 8ft. extra tough rubber cord with plug. Price £35/–/–.

Electric Heater Control, for starting and stopping at required heat and re-starting automatically, maintaining heat from 200 up to 500 degrees.

Electric Timer starts and stops oven per time on clock dial.

Bath Heater, Dux, with glazed porcelain container, nickled piping and shower, economical, clean porcelain, and less space required. Turn switch and water under control. No fumes. £9 10s.

Tennis Court.

Electric Side Lighting, with reflector, weatherproof holder and eye suspension, including 500 watt gas-filled Edison lamp, 16/6. Each light, £3 6s.

Overhead equipment, 1500 watt, G. filled Edison, £2. Each light, £3 9s.

10in. Single Fire Marvel Forge Blower, complete with direct connected 1/15 h.p. Universal variable speed motor for 240 volts D.C. or 240 volts 50 cycles A.C. supply, with 7 points, speed regulator. Price, £15.

TURBINAIR PORTABLE COMPRESSED AIR HOISTS.

Contractors are constantly finding new uses for the light single or double drum. The single drum hoist weighs only 285 lbs., will wind 500 feet of $\frac{5}{16}$in. wire rope, requires $\frac{3}{4}$in. air hose, and 75 lbs. pressure or less.

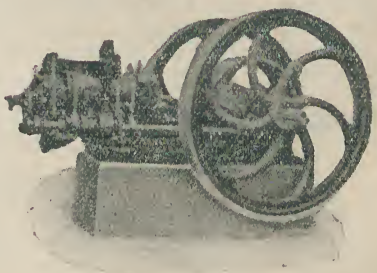
This hoist may be set on a waggon body, bolted to a timber or the base of a derrick. A hand brake and clutch are provided. The Turbinair motor gives high starting torque. This hoist will handle 2,000 lbs. on a straight vertical lift, and will pull a 50-ton freight car on level track.

Electric and steam 6½ h.p. portable hoists are also in both single drum and double drum types. Price, from £45.

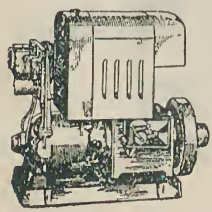
Contractors' Friction Hoist, Stationary, with lever handle for applying power from gas, steam or motor engine. On 4ft. x 3ft. frame. Price, from £35.

N.B. For information on electric light and power installation by an electrical contractor, please refer *advt. pages* 8 *and* 21.

N.B. The electrical contractor whose advt. appears on pages 8 and 21 is highly recommended for all types of work including maintenance repairs and winding, etc.—estimates supplied.



" Blackstone " Spring Injection, cold Starting, 17 B.H.P. Stationary Engine.
Price, Approx. £250.



HOUSEHOLD LIGHTING.

20 light 75 c.p. Electrical Self Contained Plant, for installing electric light.

Price, Approx. £100.

" **Westinghouse** " Light and Power Plants, 1½ h.p., 750 watt for 32 volt (operating at 1250 r.p.m.), with WG7, 100 amp. hour battery. Complete £160.

Ditto, with 134 amp. battery, £170 ; 200 amp. battery, £180.

With WG17, 267 amp. battery, £200.

Engine and generator unit only, £110.

3 h.p., 1500 watt for 32 volt, with 200 amp. hour battery. Complete, £230. With 267 amp. battery, £265.

Generator unit only, £150.

3 h.p., 1500 watt for 110 volt (operating at 1200 r.p.m.), with 100 amp. battery. Complete, £320 ; with 145 amp. battery. Complete £355 ; with 200 amp. battery. Complete, £380.

Engine and generator unit only, £160.

" **Westinghouse** " Light and Power Plant, 3 h.p., 1500 watt, for 110 volt (operating at governed speed). Operates without batteries, £165.

Note. Approximate prices only.

POWER REQUIRED FOR MACHINERY.

WOODWORKING.

Contractors' Hoist, 6 h.p.; 12in. Circular Saw, 4 h.p.; 15in. Circular Saw, 5 h.p.; 18in. Circular Saw, 6½ h.p.; 24in. Circular Saw, 10 h.p.; 30in. Band Saw, 2-3 h.p.; 12 x 5in. Tenoning Machine, 5 h.p.

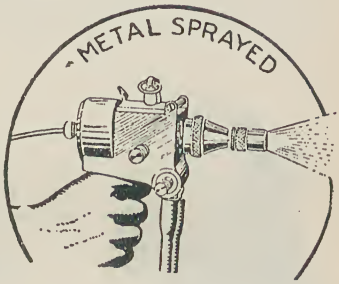
Wood Turning Lathe, 6in. centres, ¾ h.p.; 8in. centres, 1 h.p.; 10in. centres, 1½ h.p.

ELECTRICAL OXY-ACETYLENE MELTING AND SPRAYING PLANT.

METAL SPRAYING.

The Schoop Metal Spray Process is a method of applying metallic coatings to surfaces for prevention of corrosion or for ornamentation, using zinc, lead, brass, copper, tin, aluminium, bronze, nickel, monel, &c., as desired.

The applied metal in wire form is fed through an oxy-acetylene flame where it is melted, atomised and sprayed, the whole of the operation being performed in a patented spraying pistol operated by electric power or compressed air.



The Metalsprayer, weighing three and one-half pounds, is connected to standard acetylene and oxygen cylinders and to a supply of compressed air, consuming, while in use, approximately fifteen cubic feet each of the gases per hour, and fifty cubic feet per minute at 50 pounds pressure of the air.

Metallic structures are first cleaned by sand blasting before being metal sprayed.

This process is not to be confused with spraying of bronze powders suspended in lacquers.

Principal building uses are zinc spraying structural steelwork, steel sashes, water tanks, ventilating equipment.

Bronze spraying steel sashes, lift cages and enclosures, grilles, ballustradings and ornamental ironwork.

Metal Spraying Prices for Zinc.

Plate work, 1/– to 2/– per square foot.
Light Structural Steelwork, 20/– to 30/– cwt.
Heavy Structural Steelwork, 15/– to 20/– cwt.

MULTIMIX CONCRETE MIXER.

(Electric Driven.)

On Wheeled Platform.

3½ cubic feet capacity, Approx. £125.
output 30 cubic yards per hour.
7 cubic feet, batch capacity, Approx. £350.

ELECTRICAL STATIONS.

Consult Tait's Electrical Directory for Additional Information.

SYDNEY CHARGES.

Residential—5d. per unit up to 2½ units per quarter per 100 sq. ft. of built up area and 1d. per unit for all beyond that quantity for a single story building. The number of units charged at 5d. to be increased by 2½d. per sq. ft. where an electric range of not less than 4KW is used the secondary rate of 0.7d. per unit.

Continuous water heating, 0.575d. per unit.

Night water heating (between 10 p.m. and 8 a.m.) 0.35d. per unit.

Commercial rate, 5d. per unit.

For consumption over 5,000 units at 0.4d.

Large commercial supplies over 100,000 units per annum, £6 per annum per KVa of m.d. plus 0.4d. per unit for net supply the KVa rate is £4 10s. per annum.

Factory lighting, 4¾d.

Factory Power, sliding scale from 1.4d. for 160 units per H.P. per quarter.

CANBERRA.

Industrial and Commercial lighting first units per 100 s. ft. 6d. per unit, next 6 units 5d. per unit. All in excess, 4d. Power 1½d. per unit.

MELBOURNE CHARGES.

Commercial and Industrial. Block rate first 1000 units per month, 3d. per unit, second 1,000 units 2d., all in excess 1d. Max. rate 6d.

Power. Block rate first 500 units per month 1.75d. Next 500 units 1d., 1.75d. per unit.

Night rate (11 p.m. to 7 a.m.), 0.3d. per unit plus 5/– meter rent. Max. demand rate 2d. per unit.

All purposes, first 500 units per month 5d., next 2,000 units 3d., next 2,500.

BALLARAT, VIC.

Tariff F., Commercial cooking 1d. per month. Commercial lighting, first 200 units 6½d. per month, next 300, 5d. per unit.

Power and heating 24 units per month, 3½d. next 476, 2½d., next 4,500 units 1¾d. per unit.

BRISBANE, QUEENSLAND.

Commercial Lighting. Block rate up to 500 units, per month 4.5d. per unit. Remaining units 3d. per unit.

Commercial and Industrial power and heating block rate, 2,000, 1.4d. per unit, remaining units 1d. per unit.

Domestic (lighting and power combined) up to 12 units per residence or per month, 4.5d. up to 20 units 1.5d. on unit remaining units 1d. per unit.

Farm (lighting and power combined) up to 12 units per month 4.5d. up to 200 units per month 1.4d., remaining units 1.25d. per unit.

Water Heating. Minimum number chargeable to be 40 p.c. of possible consumption, 5d. per unit. No meter rents.

Rural prices are 10% in excess of city prices.

Minimum payments: Tariff (e) 3d. per month, other tariff, 5/–

ADELAIDE, S.A.

Domestic Lighting. First 500 units per month, 5½d. (10/1½), next 5,000 units 4d., (7) all in excess, 2¾d. (5d).

Commercial and Industrial. First 50KW, 8d., over 50KW., 6½d. If annual consumption between 6,000 and 60,000 units 1½d. If exceed. 60,000, 1d.

Commercial and Industrial (Power and Heating). 500 units per month 2¼d., next 500, 2d., next 1,500 units, 1.28d., next 50,000, 0.84d. All in excess, 0.74d.

Power Comsumption.

BROKEN HILL, N.S.W.

Lighting 9d. per unit, Power 4d.

BATHURST, N.S.W.

Lighting 4½d. per unit, Power 1½d. to 1¼d.
Domestic 1¼d., including lighting heating, cooking and water.

PERTH, W.A.

Lighting, 5d. per unit, Power 1¼d. per unit.
Domestic Power 1¾d. to 1d. per unit.

ALBANY, W.A.

Lighting 7d. to 6d., Power, 3d.

DARWIN.

Lighting, first 250 units per month 1/– per unit.
Power, 6d., 5d., 4d., 3d. and 2¾d. per unit.

NEW ZEALAND.

Nelson. Lighting 6d., Heating 30 units, 4d.
Commercial Lighting, first 300.

Auckland. Commercial lighting 4d. per unit.
Christchurch. Domestic supply 4d. per unit.
Commercial lighting 4d., Power 1¼d. per unit.
Taranaki Power Board. Lighting 6½d., Heating 3¼d., Power 3¼d. per unit up to ½ H.P.

TASMANIA. LAUNCESTON.

Lighting. First 1,000 units 5d. per unit.
Power and Heating. First 120 units 2d. per unit.

HOBART.

Lighting 5d. to 3d. Power 2d. to ½d.
Domestic Power 1d. to .8d. per unit.

Note : Many more Districts have been supplied since 1936, but the above list is as far as could be ascertained, so for other towns please enquire from adjacent towns where systems are installed.—C. E. Mayes.

ELECTRIC SUPPLY STATIONS THROUGHOUT AUSTRALIA & NEW ZEALAND.

Where Electricity is available for Lighting or Power for Contractors use.

In suitable choice of electric motors installed on site to suit the voltage and current.

A = Alternating Current.
D = Direct ,,
Figures = Voltage or Power.

(*Extract from Taits Electrical Directory.*)

NEW SOUTH WALES.

Adelong ..... 415/240 3 Ph. 50c.
Albury..... 415/240 3 Ph. 50c.
Ariah Park ..... 240 D.C.
Armidale..... 415/240 3 Ph. 50c.
Ballina ..... 415/240 3 Ph. 50c.
Balranald ..... 240 D.C.
Bankstown ..... 415/240 3 Ph. 50c.
Barham ..... 400/230 3 Ph. 50c.
Barmedman ..... 415/240 3 Ph. 50c.
Barraba ..... 240 D.C.
Bathurst ..... 415/240 3 Ph. 50c.
Batlow ..... 415/240 3 Ph. 50c.
Baulkham Hills ... 415/240 3 Ph. 50c.
Bega ..... 415/240 3 Ph. 50c.
Bellbird ..... 415/240 3 Ph. 50c.
Bellingen ..... 415/240 3 Ph. 50c.
Berrigan ..... 415/240 3 Ph. 50c.
Berrima ..... 440/220 3 w. D.C.
Berry ..... 415/240 3 Ph. 50c.
Bingara ..... 240 D.C.
Blackheath ..... 415/240 3 Ph. 50c.
Blacktown ..... 415/240 3 Ph. 50c.
Blayney ..... 415/210 3 Ph. 50c.
Boggabri ..... 415/240 3 Ph. 50c.
Bombala ..... 415/240 3 Ph. 50c.
Bombo ..... 415/240 3 Ph. 50c.
Boorowa ..... 415/240 3 Ph. 50c.
Bourke ..... 415/240 3 Ph. 50c.
Bowenfels ..... 415/240 3 Ph. 50c.
Bowral ..... 415/240 3 Ph. 50c.
Braidwood ..... 415/240 3 Ph. 50c. with M.E.N.
Brewarrina ..... 480/240 D.C.
Broken Hill ..... 230/115 5 Ph. 100c.
Bulli ..... 415/240 3 Ph. 50c.
Bundanoon..... 415/240 3 Ph. 50c.
Burradoo ..... 415/240 3 Ph. 50c.
Burrawang ..... 240 3 Ph. 50c.
Burrinjuck..... 415/240 3 Ph. 50c.
Cabramatta and Canley Vale 415/240 3 Ph. 50c.
Camden ..... 400/230 3 Ph. 50c.
Campbelltown ..... 415/240 3 Ph. 50c.
Canberra ..... 415/240 3 Ph. 50c.
Canowindra ..... 415/240 3 Ph. 50c.
Casino ..... 415/240 3 Ph. 50c.
Castlereagh.....*See* Colo Shire
Cessnock ..... 415/240 3 Ph. 50c.

ELECTRIC SUPPLY STATIONS—N.S.W.—(*continued*)

Clarence River County Council & Electric Construction Co. of Australia Ltd., various transmissions to district and localities, power stations and systems.
Cobar ..... 415/240 3 Ph. 50c.
Cockle Creek Transmission, see Caledonian Collieries Ltd.
Collarenebri ..... 240 D.C.
Colo Shire ..... 415/240 3 Ph. 50c.
Condobolin ..... 415/240 3 Ph. 50c.
Coolah ..... 415/240 3 Ph. 50c.
Coolamon ..... 415/240 3 Ph. 50c.
Cooma ..... 240 D.C.
Coonabarabran ..... 415/240 3 Ph. 50c.
Coonamble ..... 415/240 3 Ph. 50c.
Cootamundra ..... 415/240 3 Ph. 50c.
Copmanhurst Shire 415/240 3 Ph. 50c.
Corowa ..... 400/230 3 Ph. 50c.
Cowra ..... 415/240 3 Ph. 50c.
Crookwell ..... 240 D.C.
Culcairn ..... 415/240 3 Ph. 50c.
Cullen Bullen ..... 415/240 3 Ph. 50c.
Deniliquin ..... 415/240 3 Ph. 50c.
Denman ..... 415/240 3 Ph. 50c.
Dorrigo ..... 415/240 3 Ph. 50c.
Dorrigo Shire ..... 415/240 3 Ph. 50c.
Dubbo ..... 415/240 3 Ph. 50c.
Dundas ..... 415/240 3 Ph. 50c.
Dungog ..... 415/240 3 Ph. 50c.
Eastwood ..... 415/240 3 Ph. 50c.
Ermington and Rydalmere 415/240 3 Ph. 50c.
Estelville ..... 415/240 3 Ph. 50c.
Eugowra—No record.
Fairfield ..... 415/240 3 Ph. 50c.
Finley ..... 415/240 3 Ph. 50c.
Forbes ..... 415/240 3 Ph. 50c.
Gilgandra ..... 240 D.C.
Glenfield ..... 415/240 3 Ph. 50c.
Glen Innes ..... 415/240 3 Ph. 50c.
Gloucester ..... 415/240 3 Ph. 50c.
Gosford ..... 415/240 3 Ph. 50c.
Goulburn ..... 480/240 3w. D.C. 415/240 3 Ph. 50c.
Grafton ..... 415/240 3 Ph. 50c.
Grenfell ..... 415/240 3 Ph. 50c.
Greta ..... 415/240 3 Ph. 50c.
Gulgong ..... 415/240 3 Ph. 50c.
Gundagai ..... 415/240 3 Ph. 50c.
Gunnedah ..... 415/240 3 Ph. 50c.
Guyra ..... 415/240 3 Ph. 50c.
Harwood Shire ..... 415/240 3 Ph. 50c.
Hay ..... 415/240 3 Ph. 50c.
Helensburgh ..... 415/240 3 Ph. 50c.
Henty ..... 240 D.C.
Hillston ..... 415/240 3 Ph. 50c.
Holbrook ..... 240 D.C.
Holmesville ..... 415/240 3 Ph. 50c.
Holroyd ..... 415/240 3 Ph. 50c.
Hornsby ..... 415/240 3 Ph. 50c.
Ingleburn ..... 415/240 3 Ph. 50c.
Inverell ..... 415/240 3 Ph. 50c.
Jasper's Brush ..... 415/240 3 Ph. 50c.
Jerilderie ..... 415/240 3 Ph. 50c.
Junee ..... 415/240 3 Ph. 50c.
Kandos ..... 415/240 3 Ph. 50c.
Katoomba ..... 415/240 3 Ph. 50c.
Kearsley ..... 415/240 3 Ph. 50c.
Kempsey ..... 415/240 3 Ph. 50c.
Kiama ..... 415/240 3 Ph. 50c.
Kogarah ..... 415/240 3 Ph. 50c.
Kurri Kurri ..... 415/240 3 Ph. 50c.
Kyogle ..... 240 D.C.
Lake Cargelligo ... 415/240 3 Ph. 50c.
Lawson ..... 415/240 3 Ph. 50c.
Lismore ..... 415/240 3 Ph. 50c.
Lithgow ..... 415/240 3 Ph. 50c.
Liverpool ..... 415/240 3 Ph. 50c.
Lochhart ..... 240 D.C.
Maclean ... Clarence River County Council from Nymboida hydroelectric at 33,000 to 11,400
Manildra ..... 415/240 3 Ph. 50c.
Manilla ..... 415/240 3 Ph. 50c.
Manly ..... 415/240 3 Ph. 50c.
Merriwa ..... 415/240 3 Ph. 50c.
Millthorpe ..... 415/240 3 Ph. 50c.
Milton ..... 110 D.C.
Mittagong ..... 415/240 3 Ph. 50c.
Moama ..... 415/240 3 Ph. 50c.
Molong ..... 415/240 3 Ph. 50c.
Moree ..... 415/240 3 Ph. 50c.
Moruya ..... 415/240 3 Ph. 50c.
Moss Vale ..... 415/240 3 Ph. 50c.
Mudgee ..... 415/240 3 Ph. 50c.
Mulbring ..... 415/240 3 Ph. 50c.
Mulgoa ..... 415/240 3 Ph. 50c.
Mullumbimby ..... 415/240 3 Ph. 50c.
Murrumburrah ..... 415/240 3 Ph. 50c.
Murrurundi ..... 415/240 3 Ph. 50c.
Murwillumbah ..... 415/240 3 Ph. 50c.
Muswellbrook..... 415/240 3 Ph. 50c.
Nambucca Shire ... 415/240 3 Ph. 50c.
Narooma..... 415/240 3 Ph. 50c.
Narrabri ..... 480/240 3w. D.C. changing over to 415/240 3 Ph. 50c.
Narrandera..... 415/240 3 Ph. 50c.
Narromine ..... 415/240 3 Ph. 50c.
Newcastle ..... 415/240 3 Ph. 50c.
Nowra ..... 415/240 3 Ph. 50c.
Nymboida Shire ... 415/240 3 Ph. 50c.
Nyngan ..... 480/240 3w. D.C.
Orange ..... 415/240 3 Ph. 50c.
Orara Shire ..... 415/240 3 Ph. 50c.
Penrith ..... 415/240 3 Ph. 50c.
Picton ..... 415/240 3 Ph. 50c.
Port Kembla Power System, extensive transmission from Camden North, Cordeaux Dams, Picton, Tahmoor, Bargo, Yanderra, Yerkinbool, Aylmerton, Bowral, Moss Vale, Sutton Forest, Exeter, Bundanoon, Wollongong, Dapto, Peterborough, Shellharbour, Dunmore, Bombo, Kiama, Jamberoo and Wyndang*, Robertson, Omega, Gerringong*, Crooked River*, Derby, Nowra, Jasper's Brush—415/240 3 Ph. 50c. throughout district. * 415/240 3 Ph. 50c. Rural Districts, 240 single phase 50c. A.C.

ELECTRIC SUPPLY STATIONS (*continued*)

Portland ..... 415/240 3 Ph. 50c.
Port Macquarie ... 415/240 3 Ph. 50c.
Quirindi ..... 415/240 3 Ph. 50c.
Richmond ..... 415/240 3 Ph. 50c.
Robertson ..... 415/240 3 Ph. 50c.
Rylstone ..... 415/240 3 Ph. 50c.
Scone ..... 415/240 3 Ph. 50c.
Shellharbour ..... 415/240 3 Ph. 50c.
Singleton ..... 415/240 3 Ph. 50c.
South Grafton ..... 415/240 3 Ph. 50c.
St. Marys ..... 415/240 3 Ph. 50c.
Sutherland ..... 415/240 3 Ph. 50c.
Sydney, enquire Tait's Directory.
415/240 3 Ph. 50c.
Tamworth ..... 415/240 3 Ph. 50c.
Taree ..... 415/240 3 Ph. 50c.
Temora ..... 415/240 3 Ph. 50c.
Tenterfield ..... 415/240 3 Ph. 50c.
Terania Shire ..... 415/240 3 Ph. 50c.
The Rock ..... 240 D.C.
Trangie ..... 415/240 3 Ph. 50c.
Tumbarumba ..... 415/240 3 Ph. 50c.
Tumut..... 415/240 3 Ph. 50c.
Tuncurry ..... 415/240 3 Ph. 50c.
Ulmarra ..... 415/240 3 Ph. 50c.
Unanderra ..... 415/240 3 Ph. 50c.
Ungarie ..... 415/240 3 Ph. 50c.
Uralla ..... 240 D.C.
Wagga..... 415/240 3 Ph. 50c.
Walcha ..... 480/240 3w. D.C.
Walgett ..... 480/240 3w. D.C.
Walla Walla ..... 230 D.C.
Wallerawang ..... 415/240 3 Ph. 50c.
Warialda..... 415/240 3 Ph. 50c.
Warren ..... 415/240 3 Ph. 50c.
Warringah ..... 415/240 3 Ph. 50c.
Wauchope ..... 415/240 3 Ph. 50c.
Wellington ..... 415/240 3 Ph. 50c.
Wentworth ..... 415/240 3 Ph. 50c.
Werris Creek ..... 415/240 3 Ph. 50c.
West Maitland ..... 415/240 3 Ph. 50c.
Weston ..... 240 D.C.
West Wyalong ..... 480/240, 3w.
Whitton ..... 415/240 3 Ph. 50c.
Wilcannia ..... 415/240 3 Ph. 50c.
Wingham ..... 415/240 3 Ph. 50c.
Wollongong ..... 415/240 3 Ph. 50c.
Woy Woy ..... 415/240 3 Ph. 50c.
Yanco ..... 415/240 3 Ph. 50c.
Yass ..... 415/240 3 Ph. 50c.

NEW ZEALAND.

Apia, Samoa ..... 220/110 3 Ph. 50c.
Ashburton Power Board
400/230 3 Ph. 50c.
Auckland ..... 400/230 3w. 50c.
Banks Peninsula P.B. 400/230 3 Ph. 50c.
Bay of Plenty Power Board
400/230 3 Ph. 50c.
Bluff ..... 400/230 3 Ph. 50c.
Buller Power Board 400/230 3 Ph. 50c.
Cambridge P.B. ... 400/230 3 Ph. 50c.
Central Hawkes Bay P.B.
400/230 3 Ph. 50c.
Central Waikato P.B.
400/230 3 Ph. 50c.
Christchurch—System: Overhead Trolly 600 D.C.
Dannevirke P.B. ... 400/230 3 Ph. 50c.
Dunedin ..... 400/230 3 Ph. 50c.
Franklin P.B. ..... 400/230 3 Ph. 50c.
Golden Bay P.B. ... 400/230 3 Ph. 50c.
Grey Power Board 400/230 3 Ph. 50c.
Hamilton ..... 400/230 3 Ph. 50c.
Havelock N. ..... 400/230 3 Ph. 50c.
Hawkes Bay P.B. 400/230 3 Ph. 50c.
Heathcote ..... 400/230 3 Ph. 50c.
Hokitika ..... 400/230 3 Ph. 50c.
Horowhenoa P.B. 400/230 3 Ph. 50c.
Hutt Valley P.B. 400/230 3 Ph. 50c.
Inglewood ..... 400/230 3 Ph. 50c.
Invercargill ..... 400/230 3 Ph. 50c.
Kaiapoi ..... 400/230 3 Ph. 50c.
Kaikoura ..... 400/330 3 Ph. 50c.
Kamo ..... 400/230 3 Ph. 50c.
Kaponga ..... 400/230 3 Ph. 50c. and 230 D.C.
Kerikeri ..... 230 single phase 50c. A.C.
Lyttelton ..... 400/230 3 Ph. A.C. 50v.
Malverne P.B. 400/230 3 Ph. A.C. 50v.
Manawatu-Orona 400/230 3 Ph. A.C. 50v.
Mangaweka ... 400/230 3 Ph. A.C. 50v.
Manunui ..... 400/230 3 Ph. A.C. 50v.
Marlborough P.B. 400/230 3 Ph. A.C. 50v.
Murchison ..... 400/230 3 Ph. A.C. 50v.
Napier ..... 400/230 3 Ph. 50c. and 460/230 3w. D.C.
Nelson ..... 400/230 3 Ph. 50c.
New Plymouth ..... 400/230 3 Ph. 50c.
North Auckland P.B., North Canterbury P.B., North Island Undertaking—Fuller distribution, *see* Tait's Comprehensive Directory.
Ohakune ..... 400/230 3 Ph. 50c.
Opunake ..... 400/230 3 Ph. 50c.
Otago Central P.B. 400/230 3 Ph. 50c.
Otago P.B. ..... 400/230 3 Ph. 50c.
Palmerston N. ..... 400/230 3 Ph. 50c.
Patea ..... 400/230 3 Ph. 50c.
Picton ..... 460/230 3w. D.C.
Poverty Bay P.B. 400/230 3 Ph. 50c. and 460/230 3w. D.C.
Queenstown ..... 400/230 3 Ph. 50c.
Raetihi ..... 400/230 3 Ph. 50c.
Rangiora..... 400/230 3 Ph. 50c.
Riccarton ..... 400/230 3 Ph. 50c.
Rawhini ..... 230 D.C.
Reefton ..... 230 D.C.
Rotorua ..... 400/230 3 Ph. 50c. and 200/115 3 Ph. 50c.
South Canterbury P.B.
400/230 3 Ph. 50c.
South Island Undertaking—*See* Tait's Comprehensive Directory.
South Island P.B. 400/230 3 Ph. 50c.
South Taranaki P.B. 400/230 3 Ph. 50c.
Springs Ellesmere P.B.
400/230 3 Ph. 50c.
Stratford..... 400/230 3 Ph. 50c.
Sumner ..... 400/230 3 Ph. 50c.
Taihape ..... 460/230 3w. D.C.
Taranaki P.B. ..... 400/230 3 Ph. 50c.

ELECTRIC SUPPLY STATIONS (*continued*)

Tararua P.B. ..... 400/230 3 Ph. 50c.
Taumarunui ..... 400/230 3 Ph. 50c.
Tauranga ..... 400/230 3 Ph. 50c.
Tauranga P.B. ..... 400/230 3 Ph. 50c.
and 460/230 single phase 50c.
Te Aroha ..... 400/230 3 Ph. 50c.
Te Awamutu P.B.... 400/230 3 Ph. 50c.
Te Puke ..... 400/230 3 Ph. 50c.
Teviot P.B. ..... 400/230 3 Ph. 50c.
Thames ..... 400/230 3 Ph. 50c.
Thames Valley P.B. 400/230 3 Ph. 50c.
Timaru ..... 400/230 3 Ph. 50c.
Tolaga Bay ..... 230 D.C.
Waimairi ..... 400/230 3 Ph. 50c.
Waimea P.B. ..... 400/230 3 Ph. 50c.
Wairarapa P.B. ... 400/230 3 Ph. 50c.
Wairere P.B. ..... 400/230 3 Ph. 50c.
Wairoa ..... 400/230 3 Ph. 50c.
Wairoa P.B. ..... 400/230 3 Ph. 50c.
Wairua Falls P.S. 400/230 3 Ph. 50c.
Waitaki P.B. ..... 400/230 3 Ph. 50c.
Waitara ..... 400/230 3 Ph. 50c.
Waitemata P.B. ... 400/230 3 Ph. 50c.
Waitomo P.B. ... 400/230 3 Ph. 50c.
Wanganui ..... 400/230 3 Ph. 50c.
Wellington ..... 400/230 3 Ph. 50c.
500 D.C. for power in City.
Westland P.B. ..... 400/230 3 Ph. 50c.
Westport ..... 400/230 3 Ph. 50c.
Whakatane..... 400/230 3 Ph. 50c.
Whangarei ..... 400/230 3 Ph. 50c.

VICTORIA.

Aireys Inlet ..... 460/230 Sin. Ph. 50c.
Alexandra ..... 400/230 3 Ph. 50c.
Allansford ..... 400/230 3 Ph. 50c.
and 460/230 Sin. Ph. 50c.
Altona ..... 460/230 Sin. Ph. 50c.
Alvil ..... 460/230 Sin. Ph. 50c.
Angelsea ..... 460/230 Sin. Ph. 50c.
Apollo Bay ..... 230 D.C.
Ararat ..... 415/240 3 Ph. 50c.
Ardmona ..... 460/230 Sin. Ph. 50c.
Arundel ..... 460/230 Sin. Ph. 50c.
Avoca ..... 230 D.C.
Bacchus Marsh ..... 400/230 3 Ph. 50c.
Badagannie ..... 460/230 3 Ph. 50c.
Barnsdale ..... 400/230 3 Ph. 50c.
and 460/230 Sin. Ph. 50c.
Ballan ..... 400/230 3 Ph. 50c.
Ballarat ..... 400/230 3 Ph. 50c.
and 440/220 3w. D.C.
Barnawartha ..... 460/230 Sin. Ph. 50c.
Barwon Heads ... 460/230 Sin. Ph. 50c.
Bayles ..... 460/230 Sin. Ph. 50c.
Bayswater ..... 460/230 Sin. Ph. 50c.
Beaconsfield ..... 460/230 Sin. Ph. 50c.
Beauford..... 400/230 3 Ph. 50c.
Becac ..... 460/230 Sin. Ph. 50c.
Beechworth ..... 400/230 3 Ph. 50c.
Belgrave ..... 400/230 3 Ph. 50c.
Bena ..... 400/230 3 Ph. 50c.
and 460/230 Sin. Ph. 50c.
Benalla ..... 400/230 3 Ph. 50c.
Bendigo ..... 400/230 3 Ph. 50c.
and 440/220 3w. D.C.
Berwick ..... 460/230 Sin. Ph. 50c.
Berwick ..... 460/230 3 Ph. 50c.
Beulah ..... 460/230 3 Ph. 50c.
Birchip ..... 230 D.C.
Birregurra ..... 460/230 3 Ph. 50c.
Boisdale ..... 460/230 3 Ph. 50c.
Boolarra ..... 400/230 3 Ph. 50c.
Boort ..... 230 D.C.
Boronia ..... 460/230 Sin. Ph. 50c.
Bostock Creek ... 460/230 Sin. Ph. 50c.
Bowser ..... 400/230 3 Ph. 50c.
Boxhill ..... 400/230 3 Ph. 50c.
Braeside ..... 460/230 3 Ph. 50c.
Briagolong ..... 460/230 3 Ph. 50c.
Briarhill ..... 460/230 3 Ph. 50c.
Bright ..... 400/230 3 Ph. 50c.
Bradford ..... 230 D.C.
Broadmeadows ... 460/230 Sin. Ph. 50c.
Brunswick ..... 400/230 3 Ph. 50c.
Bruthen ..... 460/230 Sin. Ph. 50c.
Bullock Swamp 460/230 Sin. Ph. 50c.
Buln Buln ..... 460/230 Sin. Ph. 50c.
Bundoora ..... 460/230 Sin. Ph. 50c.
Bunyip ..... 460/230 Sin. Ph. 50c.
Burramine ..... 400/230 3 Ph. 50c.
Caldermeade ..... 460/230 Sin. Ph. 50c.
Campbellfield ... 460/230 Sin. Ph. 50c.
Camperdown ..... 400/230 3 Ph. 50c.
and 460/230 Sin. Ph. 50c.
Carrum ..... 400/230 3 Ph. 50c.
Casterton ..... 230 D.C.
Castlemaine ..... 400/230 3 Ph. 50c.
and 460/230 Sin. Ph. 50c.
Catani ..... 460/230 Sin. Ph. 50c.
Charlton ..... 230 D.C.
Chilton ..... 400/230 3 Ph. 50c.
Clayton ..... 460/230 Sin. Ph. 50c.
Clematis ..... 460/230 Sin. Ph. 50c.
Cloverlea..... 460/230 Sin. Ph. 50c.
Clydebank ..... 460/230 Sin. Ph. 50c.
Cobden ..... 400/230 3 Ph. 50c.
Cobram ..... 400/230 3 Ph. 50c.
Coburg ..... 400/230 3 Ph. 50c.
Cohuna ..... 230 D.C.
Colac ..... 460/230 Sin. Ph. 50c.
Colbinabbin ..... 110 D.C.
Coldstream ..... 460/230 Sin. Ph. 50c.
Coleraine..... 230 D.C.
Congupna ..... 400/230 3 Ph. 50c.
Coragulac ..... 460/230 Sin. Ph. 50c.
Cora Lynn ..... 400/230 3 Ph. 50c.
Corobrooke ..... 400/230 3 Ph. 50c.
and 460/230 Sin. Ph. 50c.
Corryong..... 400/230 3 Ph. 50c.
Cowes ..... 400/230 3 Ph. 50c.
Cow-warr ..... 400/230 3 Ph. 50c.
and 460/230 Sin. Ph. 50c.
Cranbrourne ..... 460/230 Sin. Ph. 50c.
Crib Point ..... 460/230 Sin. Ph. 50c.
Croydon ..... 400/230 3 Ph. 50c.
Dandenong ..... 460/230 Sin. Ph. 50c.
Darnum ..... 400/230 3 Ph. 50c.
Daylesford ..... 460/230 3w. D.C.
Deer Park ..... 400/230 3 Ph. 50c.
and 460/230 Sin. Ph. 50c.
Dennington ... 460/230 Sin. Ph. 50c.

ELECTRIC SUPPLY STATIONS (*continued*)

Dalmond Creek 460/230 Sin. Ph. 50c.
Diggers Rest ... 460/230 Sin. Ph. 50c.
Dimboola ..... 460/230 3w. 50c.
Dinglen ..... 460/230 3 Ph. 50c.
Donald ..... 230 D.C.
Doncaster ..... 400/200 Sin. Ph. 50c.
Dookie ..... 460/230 Sin. Ph. 50c.
Domana ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Drouin ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Drysdale ..... 460/230 Sin. Ph. 50c.
Dunbalk ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Dunolly ..... 400/230 3 Ph. 50c.
East Oakleigh ..... 400/230 3 Ph. 50c.
Echuca ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Edenhope ..... 230 D.C.
Eildonweir ..... 400/230 3 Ph. 50c.
Eldorado..... 400/230 3 Ph. 50c.
Elliminyt ..... 460/230 Sin. Ph. 50c.
Ellinbank ..... 400/230 3 Ph. 50c.
Elmore ..... 230 D.C.
Eltham ..... 460/230 Sin. Ph. 50c.
Emerald ..... 460/230 Sin. Ph. 50c.
Epping ..... 460/230 Sin. Ph. 50c.
Euroa ..... 230 D.C.
Fairhaven ..... 460/230 Sin. Ph. 50c.
Fern Tree Gully ... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Ferny Creek ..... 460/230 Sin. Ph. 50c.
Flinders Naval Base 400/230 3 Ph. 50c.
Footscray ..... 400/230 Sin. Ph. 50c.
Frankston ..... 460/230 Sin. Ph. 50c.
Garfield ..... 460/230 Sin. Ph. 50c.
Geelong ..... 400/230 3 Ph. 50c. and 440/220 3w. D.C.
Gisborne ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Glengarry ..... 400/230 3 Ph. 50c.
Glenormiston ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Glen Waverley ..... 400/300 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Gnotur ..... 460/230 Sin. Ph. 50c.
Goroke ..... 230 D.C.
Greensborough ..... 400/230 3 Ph. 50c.
Hamilton ..... 230 D.C.
Harcourt..... 400/230 3 Ph. 50c.
Harrow ..... 110 D.C.
Hastings ..... 460/230 Sin. Ph. 50c.
Hazelwood ..... 460/230 Sin. Ph. 50c.
Healesville ..... 460/230 Sin. Ph. 50c.
Heathcote ..... 230 D.C.
Heidelberg ..... 400/230 3 Ph. 50c.
Hepburn ..... 400/230 3 Ph. 50c.
Hayfield ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Hillside ..... 460/230 Sin. Ph. 50c.
Hopetoun ..... 230 D.C.
Horsham..... 460/230 3w. D.C.
Inglewood ..... 230 D.C.
Inverloch ..... 460/230 Sin. Ph. 50c.
Irrewarra ..... 460/230 Sin. Ph. 50c.
Jabarit ..... 230 D.C.
Johnsonville ..... 460/230 Sin. Ph. 50c.
Jumbunna ..... 460/230 Sin. Ph. 50c.
Kalimna ..... 460/230 Sin. Ph. 50c.
Kallista ..... 460/230 Sin. Ph. 50c.
Kalorama ..... 460/230 Sin. Ph. 50c.
Kaniva ..... 400/230 3 Ph. 50c.
Katunga ..... 460/230 Sin. Ph. 50c.
Keilor ..... 460/230 Sin. Ph. 50c.
Kerang ..... 400/200 3 Ph. 50c.
Kilmore ..... 230 D.C.
Kilsyth ..... 460/230 Sin. Ph. 50c.
Kolora..... 110 D.C.
Kongwak ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Koondrook ..... 400/230 3 Ph. 50c.
Koo-Wee-Rup ... 400/230 3 Ph. 50c.
Koroit ..... 400/230 3 Ph. 50c.
Korumburra ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Koyuga ..... 460/230 Sin. Ph. 50c.
Kyabram ..... 400/230 3 Ph. 50c.
Kyneton ..... 400/230 3 Ph. 50c.
Lake Boga ..... 400/230 3 Ph. 50c.
Lakes Entrance 460/230 Sin. Ph. 50c.
Lancaster ..... 460/230 Sin. Ph. 50c.
Lancefield ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Langlang ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Langwarrin ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Leongatha ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Leopold ..... 460/230 Sin. Ph. 50c.
Lilydale ..... 460/230 Sin. Ph. 50c. and 400/230 3 Ph. 50c.
Lindenow ..... 460/230 Sin. Ph. 50c.
Loch ..... 460/230 Sin. Ph. 50c.
Lorne ..... 460/230 Sin. Ph. 50c. and 400/230 3 Ph. 50c.
Lower Plenty ... 460/230 Sin. Ph. 50c.
Lucknow..... 460/230 Sin. Ph. 50c.
Macedon ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Maffra ..... 460/230 Sin. Ph. 50c.
Maldon ..... 460/230 Sin. Ph. 50c.
Manangatang ..... 230 D.C.
Mansfield ..... 460/230 Sin. Ph. 50c.
Maryborough ..... 400/230 3 Ph. 50c.
Meeniyan ..... 460/230 Sin. Ph. 50c.
Melbourne ..... 460/230 3 Ph. 50c. and 400/230 3 Ph. 50c.
Merrigum ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Metung ..... 460/230 Sin. Ph. 50c.
Mildura ..... 400/230 3 Ph. 50c.
Minyip ..... 230 D.C.
Mirboo North..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Moe ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Monbulk ..... 460/230 Sin. Ph. 50c.
Monegeeta ..... 460/230 Sin. Ph. 50c.
Monomeith ..... 460/230 Sin. Ph. 50c.
Montmorency..... 460/230 Sin. Ph. 50c.
Montpark ..... 400/230 3 Ph. 50c.

ELECTRIC SUPPLY STATIONS (*continued*)

Montrose..... 400/230 3 Ph. 50c.
Moolap ..... 460/230 Sin. Ph. 50c.
Mornington ..... 400/230 Sin. Ph. 50c. and 400/230 3 Ph. 50c.
Mortlake ..... 400/230 3 Ph. 50c.
Morwell ..... 400/230 3 Ph. 50c.
Mossiface ..... 400/230 3 Ph. 50c.
Mount Dandenong 400/230 3 Ph. 50c.
Mount Eliza ..... 400/230 3 Ph. 50c.
Mount Evelyn ... 400/230 3 Ph. 50c.
Mount Martha ... 460/230 Sin. Ph. 50c.
Mount Waverley 460/230 Sin. Ph. 50c.
Moyarra ..... 460/230 Sin. Ph. 50c.
Murchison ..... 400/230 3 Ph. 50c.
Murrayville ..... 400/230 3 Ph. 50c.
Murtoa ..... 230 D.C.
Murtleford ..... 400/230 3 Ph. 50c.
Nagambie ..... 460/230 3w. D.C.
Nalangil ..... 460/230 Sin. Ph. 50c.
Narre Warren ... 460/230 Sin. Ph. 50c.
Nathalia ..... 400/230 3 Ph. 50c.
Natimuk ..... 400/230 3 Ph. 50c.
Nauru ... 550 and 110 50c. 3 Ph. and Sin. Ph. A.C.; 500 D.C.
Nayook ..... 460/230 Sin. Ph. 50c.
Neerim ..... 460/230 Sin. Ph. 50c.
Neerim South ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
New Gisborne ... 460/230 Sin. Ph. 50c.
Newry ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Nhill ..... 460/230 3w. D.C.
Nicholson ..... 460/230 Sin. Ph. 50c.
Nilma ..... 460/230 Sin. Ph. 50c.
Noble Park..... 400/230 3 Ph. 50c.
Noojee..... 460/230 Sin. Ph. 50c.
Noorat ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Northcote ..... 400/230 3 Ph. 50c.
Notting Hill ..... 460/230 Sin. Ph. 50c.
Numurkah ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Nyah ..... 400/230 3 Ph. 50c.
Nyora ..... 460/230 Sin. Ph. 50c.
Ocean Grove ... 550 & 110; 500 50c. 3 Ph. and Sin. Ph.
Ocean Island ..... 550/110 3 Ph. 50c. and single phase A.C. 500.
Officer ..... 460/230 Sin. Ph. 50c.
Olinda..... 460/230 Sin. Ph. 50c..
Omeo ..... 400/230 3 Ph. 50c
Orbost ..... 230 D.C.
Ouyen ..... 230 D.C.
Pakenham ..... 460/230 Sin. Ph. 50c.
Point Lonsdale ... 460/230 Sin. Ph. 50c.
Pomborneit ..... 460/230 Sin. Ph. 50c.
Poowong ..... 460/230 Sin. Ph. 50c.
Portarlington ... 460/230 Sin. Ph. 50c.
Port Campbell ..... 230 D.C.
Port Fairy ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c. A.C.
Portland ..... 400/230 3 Ph. 50c.
Port Melbourne ... 400/230 3 Ph. 50c.
Rainbow ..... 230 D.C.
Riddell ..... 460/230 Sin. Ph. 50c.
Ringwood ..... 460/230 Sin. Ph. 50c.
Rochester ..... 400/230 3 Ph. 50c.
Romsey ..... 400/230 3 Ph. 50c.
Rosebud ..... 400/230 3 Ph. 50c.
Rosedale ..... 460/230 Sin. Ph. 50c.
Royston ..... 400/230 3 Ph. 50c.
Rubicon ..... 460/230 Sin. Ph. 50c.
Ruby ..... 400/230 3 Ph. 50c.
Rupanyup ..... 230 D.C.
Rushworth ..... 230 D.C.
Rutherglen ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Rye ..... 460/230 Sin. Ph. 50c.
Sale ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Sassafras ..... 460/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Seaford ..... 400/230 3 Ph. 50c and 460/230 Sin. Ph. 50c.
Sea Lake..... 230 D.C.
Selby ..... 460/230 Sin. Ph. 50c.
Seymour ..... 400/230 3 Ph. 50c.
Shepparton..... 460/230 Sin. Ph. 50c.
Sherbrooke ..... 460/230 Sin. Ph. 50c.
Silvan ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Sumers ..... 460/230 Sin. Ph. 50c.
Sumerville ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Sorrento ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Springhurst ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Springvale ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
St. Albans ..... 460/230 Sin. Ph. 50c.
Stanhope ..... 230 D.C.
St. Arnaud ..... 400/230 3 Ph. 50c.
State Electricity Comm. of Vic. Currum Electric Supply Co. Melbourne and Suburbs and outlying towns, Williamstown, Albury, Corowa, Moama and Tocumwell, 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Stawell ..... 400/230 3 Ph. 50c.
Stony Creek ..... 460/230 Sin. Ph. 50c.
Stratford..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph., 50c.
Strathmerton ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Sunbury ..... 400/230 3 Ph. 50c.
Sunnyside ..... 460/240 Sin. Ph. 50c.
Swan Hill ..... 400/230 3 Ph. 50c.
Swan Island ..... 400/230 3 Ph. 50c.
Swan Reach ..... 460/230 Sin. Ph. 50c.
Tallangatta ..... 400/230 3 Ph. 50c.
Tallygaroopna 460/230 Sin. Ph. 50c.
Tally Ho ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. A C. 50c.
Taradale ..... 400/230 3 Ph. 50c.
Tatura..... 400/230 3 Ph. 50c.
Tecoma ..... 400/230 3 Ph. 50c.
Terang ..... 460/230 Sin. Ph. 50c. and 400/230 3 Ph. 50c.
Toora ..... 400/230 Sin. Ph. 50c. and 400/230 3 Ph. 50c.
Torquay ..... 460/230 Sin. Ph. 50c. and 400/230 3 Ph. 50c.

ELECTRIC SUPPLY STATIONS (*continued*)

Trafalgar ..... 460/230 Sin. Ph. A.C. and 400/230 3 Ph. 50c.
Traralgon ..... 400/230 3 Ph. 50c.
Tremont ..... 460/230 Sin. Ph. 50c.
Trentham ..... 400/230 3 Ph. 50c.
Tyabb ..... 400/230 3 Ph. 50c.
Tyers ..... 460/230 Sin. Ph. 50c.
Tynong ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Ultima ..... 400/230 3 Ph. 50c.
Underbool ..... 230 D.C.
Upper Beaconsfield 460/230 Sin. Ph. 50c.
Upwey ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Violet Town ..... 400/230 3 Ph. 50c.
Wahgunyah ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Wangaratta ..... 400/230 3 Ph. 50c.
Wantirna ..... 400/230 3 Ph. 50c.
Warburton ..... 400/230 3 Ph. 50c.
Warncoort ..... 460/230 Sin. Ph. 50c.
Warracknabool ..... 400/230 3 Ph. 50c.
Warragul ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Warrandyte ..... 400/230 3 Ph. 50c.
Warrion ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Warrnambool..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Watsonia ..... 400/230 3 Ph. 50c.
Wedderburn ..... 400/230 3 Ph. 50c.
Weerite ..... 400/230 3 Ph. 50c.
Werribee ..... 400/230 3 Ph. 50c.
Wheler's Hill..... 460/230 Sin. Ph. 50c.
Williamstown..... 400/230 3 Ph. 50c.
Winchelsea ..... 460/230 Sin. Ph. 50c.
Wiseleigh ..... 460/230 Sin. Ph. 50c.
Wodonga ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Wonthaggi ..... 450/240 3 Ph. 50c.
Woodend ..... 400/230 3 Ph. 50c. and 460/230 Sin. Ph. 50c.
Wool Wool ..... 400/230 3 Ph. 50c.
Woomelang ..... 110 D.C.
Wunganu ..... 460/230 Sin. Ph. 50c.
Wycheproof ..... 230 D.C.
Wyuna ..... 460/230 Sin. Ph. 50c.
Wy-Yung ..... 400/230 3 Ph. 50c.
Yallourn ..... 400/230 3 Ph. 50c.
Yannathan ..... 460/230 Sin. Ph. 50c.
Yarra Glen ..... 460/230 Sin. Ph. 50c.
Yarragon ..... 400/230 3 Ph. 50c.
Yarram ..... 400/230 3 Ph. 50c.
Yarrawonga ..... 400/230 3 Ph. 50c.

WEST AUSTRALIA.

Albany ..... 440/220 3 Ph. 50c.
Balungup ..... 200 D.C.
Bassendean ..... 440/250 3 Ph. 40c.
Beadon Point..... 220 D.C.
Bencubbin ..... 220 D.C.
Beverley ..... 220 D.C.
Boulder ..... 440/220 3w. D.C.
Boyup Brook ..... 220 D.C.
Bridgetown ..... 440/220 3w. D.C.
Brooktown ..... 440/220 3w. D.C.
Brucerock ..... 440/220 3w. D.C.
Brunswick ..... 220 D.C.
Bunbury ..... 440/220 3w. D.C.
Busselton ..... 220 D.C.
Capel ..... 220 D.C.
Carnamah ..... 240/220 3w. D.C.
Carnavon ..... 220 D.C.
Claremont ..... 415/240 3 Ph. 50c.
Capel ..... 220 D.C.
Carnamah ..... 440/220 3w. D.C.
Carnarvon ..... 220 D.C.
Claremont ..... 440/250 3 Ph. 40c.
Collie ..... 440/250 3 Ph. 40c. 40c. 3 Ph. A.C., 550/250 D.C. 3w.
Coolgardie ..... 240 D.C.
Coorow ..... 220 D.C.
Corrigin ..... 240 D.C.
Cue ..... 220 D.C.
Cunderdin ..... 220 D.C.
Dalwallinu ..... 220 D.C.
Denmark ..... 220 D.C.
Donnybrook ..... 220 D.C.
Dowerin ..... 230 D.C.
Dumble Young ..... 220 D.C.
Esparence ..... 220 D.C.
Forrest ..... 220 D.C.
Fremantle ..... 440/220 3w. D.C.
Gnowangerup..... 220 D.C.
Godmalling..... 220 D.C.
Green Bushes ..... 220 D.C.
Guildford ..... 440/250 3 Ph. 40c.
Harvey ..... 220 D.C.
Kalgoorlie ..... 440/220 3w. D.C. and 550, 220 and 110 3 Ph. 40c.
Katanning ..... 220 D.C.
Kellerberrin ..... 220 D.C.
Kojonup ..... 460/230 Sin. Ph. 50c.
Kondinin ..... 440/220 3w. D.C.
Koorda ..... 220 D.C.
Kulin ..... 220 D.C.
Kununoppin ..... 220 D.C.
Lake Grace..... 220 D.C.
Leonora ..... 440/220 3w. D.C.
Mandurah ..... 220 D.C.
Manjimup ..... 220 D.C.
Meckering ..... 220 D.C.
Meekatharra ..... 220 D.C.
Menzies ..... 220 D.C.
Merredin ..... 220 D.C.
Midland Junction ... 440/250 3 Ph. 40c.
Mingenew ..... 220 D.C.
Moora ..... 220 D.C.
Morawa ..... 220 D.C.
Mount Barker ..... 220 D.C.
Mount Magnet ..... 220 D.C.
Mullewa ..... 220 D.C.
Mundaring ..... 220 D.C.
Nannup ..... 220 D.C.
Narembeen ..... 220 D.C.
Narrogin ..... 440/250 3 Ph. 40c.
New Norcia ..... 110 D.C.
Northam ..... 440/220 3w. D.C.
Northamton ..... 220 D.C.
North Fremantle ... 440/250 3 Ph. 40c.
Perenjori ..... 220 D.C.

ELECTRIC SUPPLY STATIONS (*continued*)

Perth ..... 440/250 3 Ph. 40c.
Pingelly ..... 220 D.C.
Pinjarra ..... 220 D.C.
Port Arthur ..... 240 D.C.
Rockingham ..... 440/250 3 Ph. 40c.
Rottnest ..... 220 D.C.
Shackleton ..... 3½-kW. D.C.
Southern Cross ..... 250 D.C.
South Perth ..... 440/250 3 Ph. 40c.
Subiaco ..... 440/250 3 Ph. 40c.
Tumbellup ..... 230 D.C.
Tammin ..... 220 D.C.
Trayning ..... 220 D.C.
Wagin ..... 220 D.C.
Waroona ..... 220 D.C.
Wickepin ..... 230 D.C.
Wiluna ..... 440/250 3 Ph. 50c.
Wongan Hills ..... 240 D.C.
Wooroloo ..... 220 D.C.
Wyalcatchem ..... 220 D.C.
Wyndham ..... 220 D.C.
Yalgoo ..... 220 D.C.
Yalingup ..... 220 D.C.
Yarloop ..... 440/220 3w. D.C.

QUEENSLAND.

Allora ..... 415/240 3 Ph. 50c.
Ayr ..... 440/220 3w.
Babinda ..... 415/240 3 Ph. 50c.
Barcaldine ..... 240 D.C.
Barron Falls ..... 415/240 3 Ph. 50c.
Beaudesert ..... 480/240 3w. D.C.
Blackall ..... 480/240 3w. D.C.
Boonah ..... 220 D.C.
Bowen ..... 415/240 3 Ph. 50c.
Brisbane ..... 415/240 3 Ph. 50c.
Bundaberg ..... 480/240 3w. D.C.
Cairns ..... 415/240 3 Ph. 50c.
Charlieville ..... 480/240 3w. D.C.
Charters Towers ... 415/240 3 Ph. 50c.
Childers ..... 220 D.C.
Chinchella ..... 415/240 3 Ph. 50c.
Clermont ..... 415/240 3 Ph. 50c.
Cloncurry ..... 415/240 3 Ph. 50c.
Coolangatta ..... 415/240 3 Ph. 50c.
Crowsnest ..... 415/240 3 Ph. 50c.
Cunnamulla ..... 415/240 3 Ph. 50c.
Dalby ..... 480/240 3w.
Emerald ..... 415/240 3 Ph. 50c.
Gayndah ..... 240 D.C.
Gladstone ..... 415/240 3 Ph. 50c.
and 480/240 3w. D.C.
Goondiwindi ..... 240 D.C.
Gympie ..... 480/240 3w. D.C.
Home Hill ..... 415/240 3 Ph. 50c.
Hughenden ..... 480/240 3w.
Ingham ..... 415/240 3 Ph. 50c.
Innisfail ..... 415/250 3 Ph. 50c.
Ipswich ..... 415/240 3 Ph. 50c.
Killarney ..... 415/240 3 Ph. 50c.
Kingardy ..... 480/240 3w.
Longreach ..... 480/240 3w.
Mackay ..... 415/240 3 Ph. 50c.
Maryborough ..... 415/240 3 Ph. 50c.
Mitchell ..... 415/240 3 Ph. 50c.
Monto ..... 415/240 3 Ph. 50c.
Mount Isa ..... 415/240 3 Ph. 50c.
Murgon ..... 415/250 3 Ph. 50c.
Nambour ..... 415/240 3 Ph. 50c.
Nanango ..... 415/240 3 Ph. 50c.
Pialba ..... 415/240 3 Ph. 50c.
Redcliffe ..... 415/240 3 Ph. 50c.
Rockhampton ..... 415/240 3 Ph. 50c.
Roma ..... 220 D.C.
Sarina ..... 415/240 3 Ph. 50c.
Southport ..... 415/240 3 Ph. 50c.
Stanthorp ..... 415/240 3 Ph. 50c.
St. George ..... 480/240 3w. D.C.
Thargamindah ..... 220 D.C.
Theodore ..... 240 D.C.
Toowoomba ..... 415/240 3 Ph. 50c.
and 480/240 3w. D.C.
Townsville ..... 415/240 3 Ph. 50c.
Tully ..... 415/240 3 Ph. 50c.
Warwick ..... 440/230 3w. D.C.
limited supply at 240 Sin. Ph. A.C.
Winton ..... 480/240 3w. D.C.
Wondai ..... 415/240 3 Ph. 50c.

SOUTH AUSTRALIA.

Ardrossan ..... 220 D.C.
Barmeda ..... 415/240 3 Ph. 50c.
Berri ..... 230 D.C.
Bordertown ..... 400/230 3 Ph. 50c.
Burra ..... 400/230 3 Ph. 50c.
Bute ..... 240 D.C.
Ceduna ..... 220 D.C.
Clare ..... 415/240 3 Ph. 50c.
Cleve ..... 230 D.C.
Cockburn ..... 220 D.C.
Cowell ..... 220 D.C.
Crystal Brook ..... 415/240 3 Ph. 50c.
Curra Mulka ..... 110 D.C.
Davenport ..... 460/230 3w. D.C.
Edithburgh ..... 200 D.C.
Goolwa ..... 415/240 3 Ph. 50c.
Kadina ..... 240 D.C.
Koolunga ..... 110 D.C.
Lameroo ..... 230 D.C.
Laura ..... 220 D.C.
Loxton ..... 220 D.C.
Maitland ..... 230 D.C.
Mannin ..... 220 D.C.
Millicent ..... 230 D.C.
Minlaton ..... 230 D.C.
Moonta ..... 230 D.C.
Moorooduc ..... 450 3 Ph. 50c.
Mooroolbark ..... 460/230 Sin. Ph. 50c.
Mooroopna ..... 400/230 3 Ph. 50c.
Morgan ..... 220 D.C.
Mount Gambia ..... 460/230 3w.
Murray Bridge ..... 440/220 3w.
Naracoorte ..... 220 D.C.
Nar-Nargoon ..... 460/230 Sin. Ph. 50c.
Orroroo ..... 240 D.C.
Pendla ..... 460/230 3w. D.C.
Peterborough ..... 460/230 3w. D.C.
Pinnaroo ..... 400/230 3 Ph. 50c.
Port Augusta ..... 460/230 3w. D.C.
Port Augusta West ... 460/230 3w. D.C.
Port Broughton ..... 240 D.C.
Port Lincoln ..... 415/240 3 Ph. 50c.
Port MacDonnell ..... 230 D.C.

ELECTRIC SUPPLY STATIONS (*continued*)

Quern ..... 220 D.C.
Redhill..... 240 D.C.
Renmark..... 460/230 3w. D.C.
Renmark Irrigation Trust
400/230 3 Ph. 50c.
Robe ..... 400/230 3 Ph. 50c.
Snowtown ..... 220 D.C.
Springton ..... 110 D.C.
Strathalbyn ..... 220 D.C.
Streaky Bay ..... 230 D.C.
Tailem Bend ..... 400/230 3 Ph. 50c.
Railway Dept. 460/230 3w. D.C.
Tanunda ..... 220 D.C.
Tumby Bay ..... 240 D.C.
Victor Harbour ... 415/240 3 Ph. 50c.
Waikerie ..... 415/240 3 Ph. 50c.
Wallaroo ..... 415/240 3 Ph. 50c.
Wayalla ..... 220 Sin. Ph. 50c.
Wilmington ..... 230 D.C.
Woodside ..... 415/240 3 Ph. 50c.
Yankalill..... 415/240 3 Ph. 50c.

PAPUA.

Port Moresby ..... 415/240 3 Ph. 50c.

NEW GUINEA.

Rabaul ..... 220/110 Sin. Ph. 50c.
Salamaua ..... 415/240 3 Ph. 50c.
Samarai Papua ..... 240 D.C.
Suva, Fiji ..... 480/240 3w. D.C.

TASMANIA.

Beaconsfield ..... 415/240 3 Ph. 50c.
Bothwell ..... 415/240 3 Ph. 50c.
Brighton ..... 415/240 3 Ph. 50c.
and 240 Sin. Ph. 50c.
Burnie ..... 415/240 3 Ph. 50c.
Campbelltown ..... 415/240 3 Ph. 50c.
Cygnet ..... 415/240 3 Ph. 50c.
Deloraine ..... 415/240 3 Ph. 50c.
Derby ..... 415/240 3 Ph. 50c.
Devonport ..... 415/240 3 Ph. 50c.
Evandale ..... 415/240 3 Ph. 50c.
and 240 Sin. Ph. 50c.
Fingal ..... 415/240 3 Ph. 50c.
Geeveston ..... 415/240 3 Ph. 50c.
and 240 Sin. Ph. 50c.
Georgetown ..... 415/240 3 Ph. 50c.
Germanston ..... 230 Sin. Ph. 50c.
Green Ponds ..... 415/240 3 Ph. 50c.
Hobart ... 415/240 3 Ph. 50c. D.C. and A.C. ; 480 D.C. in city.
Huonville ..... 415/240 3 Ph. 50c.
and 240 volts Sin. Ph. 50c.
Hydroelectric for localities and powers, *see Tait Elec. Directory.*
Kingston..... 415/240 3 Ph. 50c.
and 240 Sin. Ph. 50c.
Lake Margaret Hydro Electric Station 3000 and 500 3 Ph. 50c. and 230 3 Ph. 50c.
Latrobe ..... 415/240 3 Ph. 50c.
Launceston..... 415/240 3 Ph. 50c.
Longford..... 415/240 3 Ph. 50c.
Moprina ..... 415/240 3 Ph. 50c.
and 110 Sin. Ph. A.C.
New Norfolk ..... 415/240 3 Ph. 50c.
and 240 Sin. Ph. 50c.
Oatlands ..... 415/240 3 Ph. 50c.
Queenstown ..... 220 Sin. Ph. 50c.
Richmond ..... 240 Sin. Ph. 50c.
Rosebery ..... 415/240 3 Ph. 50c.
Ross ..... 415/240 3 Ph. 50c.
Scottsdale ..... 415/240 3 Ph. 50c.
Sheffield ..... 415/240 3 Ph. 50c.
Sorell ..... 240 Sin. Ph. 50c.
Stanley ..... 415/240 3 Ph. 50c.
Ulverstone ..... 415/240 3 Ph. 50c.
and 240 Sin. Ph. 50c.
Waddamana Power, Waratah ... 550 and 240/110 A.C.
Westbury ..... 415/240 3 Ph. 50c.
and 240 Sin. Ph. 50c.
Wynyard ..... 415/240 3 Ph. 50c.
and 240 Sin. Ph. 50c.

GLASS BRICKS

"INSULUX" (Agee) HOLLOW GLASS BRICK CONSTRUCTION.

The following details in connection with the construction of Glass Bricks are supplied merely as a guide. For full information and essential details for construction please communicate direct with the manufacturers of "Insulux" (Agee) Hollow Glass Bricks—Australian Window Glass Pty. Ltd., Euston Road, Alexandria, N.S.W.—or with their representatives in other States, whose names and addresses are as follows :—

Australian Window Glass Pty. Ltd., 428 Spencer Street, Melbourne, Vic.

Australian Glass Manufacturers Co. Ltd., Montague Road, South Brisbane, Q'ld.

Australian Glass Manufacturers Co. Ltd., Worando Building, Grenfell Street, Adelaide, S.A.

Australian Glass Manufacturers Co. Ltd., 359 Murray Street, Perth, W.A.

S. F. Harries, 53 Fort Street, Auckland, N.Z.

They will be pleased to supply you with all the details required, by return mail.

"Insulux" (Agee) Hollow Glass Bricks, while of great structural strength, are definitely NOT sold as A LOAD-BEARING MATERIAL. Under no circumstances should they carry any super-imposed loading —therefore it is necessary that lintels be used over all openings irrespective of the width.

It is important that EXPANSION JOINTS BE PROVIDED at the HEAD and BOTH ENDS (jambs) of all "Insulux" panels, irrespective of the height and width. A minimum expansion joint of 1in. must be provided at the head, and ½in. at either end (jambs) of the panel.

Glass Bricks should be recessed into adjacent building material at least 1½in. at both the head and jambs, this recess to be additional to the expansion joints mentioned above, and ALL EXPANSION JOINTS MUST BE KEPT CLEAR OF MORTAR OR OTHER EXTRANEOUS MATTER.

All expansion joints should be filled with loosely packed Picker Tow, obtainable from any rope manufacturing firm, or direct from the local manufacturer of "Insulux," or their representatives.

Where the Glass Bricks are recessed into adjacent building materials it is necessary that the aperture on either side of the Glass Brick and between the Glass Bricks and the adjacent building materials, be packed firmly with Picker Tow, to ensure lateral strength, and this aperture must also be caulked at the outer edges for at least ½ in. (to ensure a weather-proof job) with a guaranteed non-hardening water-repellent caulking compound.

Mortar Mix :

4 parts of clean sand (by volume)
1 „ „ cement (by volume)
1 „ „ hydrated lime (by volume)

Work with mortar as stiff as possible. WATER MUST NOT BE USED FREELY. If mortar is too wet it will retard the laying and possibly cause voids.

Laying :

Fill all mortar joints completely. DO NOT STRIKE GLASS BRICKS WITH METAL TOOLS.

Lay up not more than the equivalent of five courses of the 6½in. square Brick at a time, and allow the mortar to attain its initial set before continuing with succeeding courses. All mortar joints should be ¼in. in thickness and should be tooled after the mortar has attained its initial set, to ensure of a finished job.

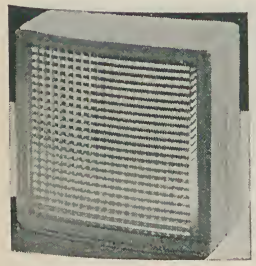
All exterior flutings on Glass Bricks are to be set vertical.

Reinforcing :

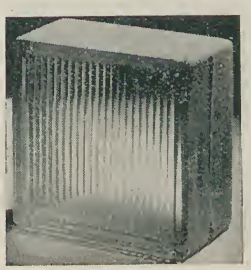
BRICKTOR or 22 gauge galv. EXMET 2½in. wide is recommended for reinforcing, and reinforcing should run continuously and be tied into the adjacent building material at least 12in. in the case of brickwork or reinforced concrete. If channel iron or angle irons are used to form a chase at either end of the panel, the reinforcing should be welded or bolted thereto. The reinforcing should be embedded in the centre of the mortar joints.

In panels not exceeding 60 square feet in area and not exceeding 10 feet in length or height, the reinforcing should be used every third course in the case of the 6½in. square and the 9⅛in. x 4 13/16in. x 4in. thick Glass Bricks, and every course in the case of the 9⅞in. square Glass Brick. For reinforcing panels of a greater dimension please refer to the manufacturer.

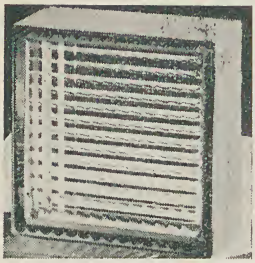
If in doubt on any point communicate immediately with the manufacturers or their representatives.



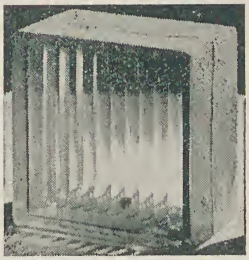
Series No. A4 consists of ¼ inch ribs, carried vertically on both exterior faces and horizontally on both interior faces. Size : 6½ ins. square by 4 ins. thick.



Series No. B4 consists of ¼ inch ribs carried vertically on both exterior faces. Both interior faces are smooth. Size : 6½ ins. square by 4 ins. thick.

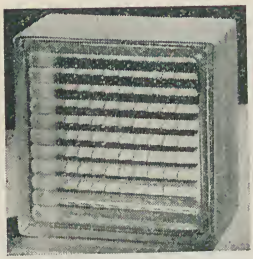


Series No. F4 consists of $\frac{1}{2}$ inch ribs carried vertically on both exterior faces and horizontally on both interior faces. Size: $6\frac{1}{2}$ ins. square by 4 ins. thick.

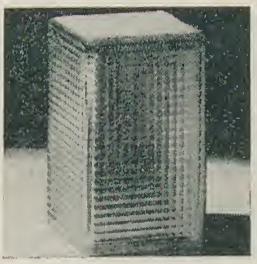


Series No. H4 consists of $\frac{1}{2}$ inch ribs carried vertically on both interior faces. Both exterior faces are smooth. Size: $6\frac{1}{2}$ ins. square by 4 ins. thick.

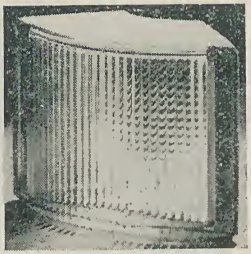
Series Nos. Full brick A6, Half brick A2, consist of $\frac{1}{4}$ inch ribs carried vertically on both exterior faces and horizontally on both interior faces. Sizes: Full brick, $9\frac{1}{8}$ x $4\frac{13}{16}$ x 4 ins. thick. Half brick, $4\frac{7}{16}$ x $4\frac{13}{16}$ x 4 ins. thick.



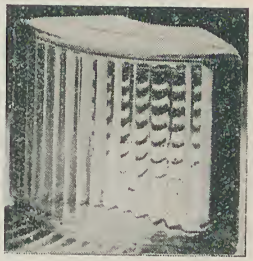
Series No. K4 consists of $\frac{1}{2}$ inch ribs carried vertically on one interior face and horizontally on the other. Exterior faces are smooth. Size: $6\frac{1}{2}$ ins. square by 4 ins. thick.



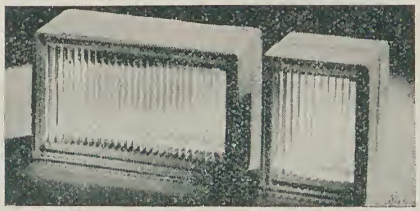
Corner brick, Series A, consists of $\frac{1}{4}$ inch ribs carried vertically on both adjacent interior faces, and horizontally in both adjacent exterior faces. Size: $6\frac{1}{2}$ ins. high by 4 ins. square.



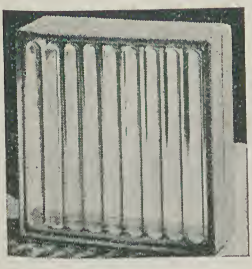
Light Transmitting Corner Brick, Series No. A4. Height 6½ in. Light Transmitting Corner Bricks are available only for use in conjunction with the 6½ in. square by 4 in. thick bricks.



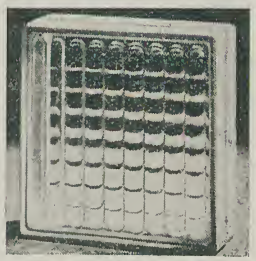
Light Transmitting Corner Brick, Series No. F4. Height 6½ in. Light Transmitting Corner Bricks are available only for use in conjunction with the 6½ in. square by 4 in. thick bricks.



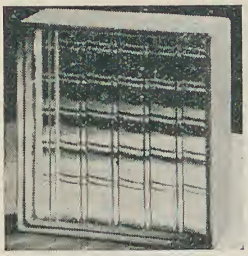
Series Nos. Full brick B6, Half brick B2, consist of ¼ inch ribs carried vertically on both exterior faces. Both interior faces are smooth. Sizes: Full brick, 9⅛ x 4 $\frac{13}{16}$ x 4 ins. thick. Half brick, 4 $\frac{7}{16}$ x 4 $\frac{13}{16}$ x 4 ins. thick.



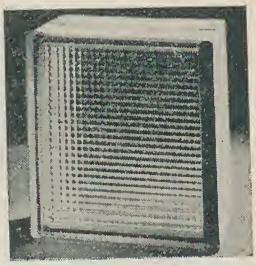
Series No. M8 consists of 1 inch ribs carried vertically on both interior faces. Both exterior faces are smooth. Size: 9⅛ in. square by 4 ins. hick.



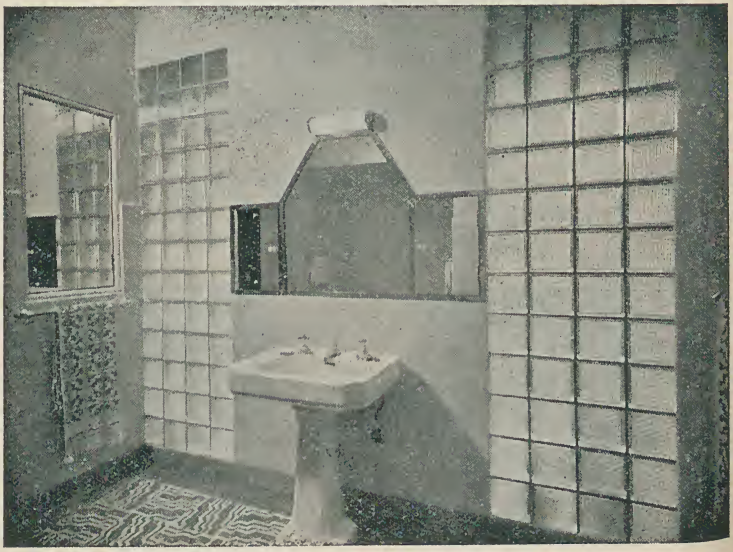
Series No. R8 consists of 1 in. ribs carried vertically on one interior face and horizontally on the other. Exterior faces are smooth. Size 9⅛ in. square by 4 ins. thick.



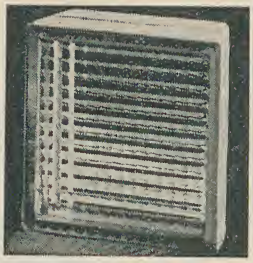
Series No. S8 consists of 1⅛ in. concave ribs carried vertically on one interior face and horizontally on the other. Exterior faces are mooth. Size: 9⅞ in. square by 4 in. thick.



Radial Brick, Series No. A4. Can be laid to varying radii from 2 ft. 6 in. to 6ft. through variation in mortar joint. Width of long face 6½ in.; of short face 5⅞ in. This brick also available in the same size in F4 series. Radial bricks are available only for use in conjunction with the 6½ in. square by 4 ins. thick bricks.

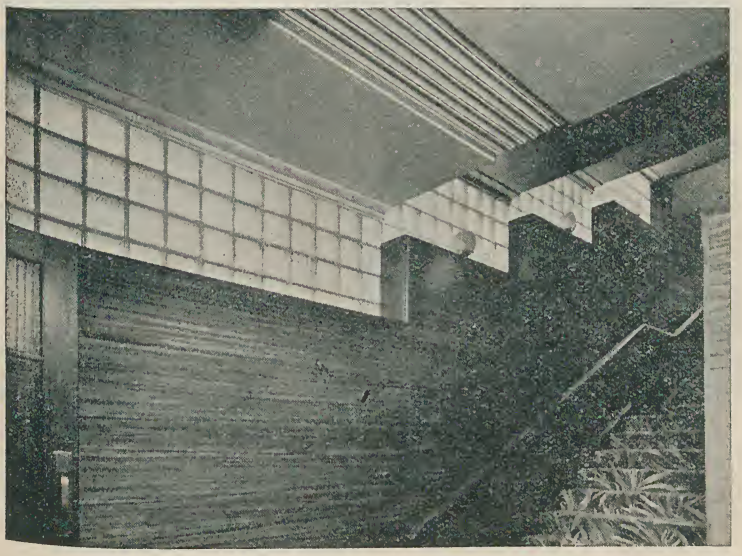


Ideal bathroom treatment with "Insulux" Glass Bricks in a Melbourne home. Complete privacy is assured while perfect lighting at the mirror is achieved. Architect: E. H. J. Liebel.



Radial Brick series No. F4 can be laid to varying radii from 2 ft. 6 in. to 6ft. through variation in mortar joint. Width of long face $6\frac{1}{2}$ in.; of short face $5\frac{3}{4}$ in. This brick also available in the same size in A4 series. Radial bricks are available only for use in conjunction with $6\frac{1}{2}$ in. square by 4 in. thick bricks.

Series No. H6 consists of $\frac{1}{2}$ inch ribs carried in the length of the brick on both interior faces. Both exterior faces are smooth. Size: $9\frac{1}{8}$ x $4\frac{13}{16}$ x 4 ins. thick.



"Insulux" Glass Bricks direct natural light onto the magnificent staircase of the New Carlton Hotel, Geelong, Victoria. Architects: Schefferle and Davies. Builders: Taylor & Sons Pty. Ltd.

"INSULUX" (Agee) HOLLOW GLASS BRICKS.

The advantages of using Glass Bricks are that they combine properties that are available in no other building material. They are ATTRACTIVE as a unit and ATTRACTIVE in the finished job. They are TRANSLUCENT and provide PRIVACY in accordance with the pattern used. They have a HIGH DIFFUSED DAYLIGHT TRANSMISSION of a desirable character, WITHOUT allowing the FLOW of HEAT. They are SOUND-DEADENING, MOISTURE-PROOF, of GREAT STRUCTURAL STRENGTH, and can be, CLEANED and MAINTAINED at a LOW COST. They PREVENT the PASSAGE of AIR and GASES, are IMPERVIOUS to the ATTACKS of MOISTURE, VERMIN and ACIDS, and WILL NOT ABSORB ODOURS or GREASE, and are therefore clean and sanitary, as well as being non-combustible. They offer major economies in the construction of air-conditioned and artificially heated buildings, and it must be REMEMBERED that NO PLASTERING, PAINTING or PAPERING is required on either INTERIOR or EXTERIOR WALLS. The bricks are exceptionally STRONG, but are LIGHT IN WEIGHT, and are of a SIZE that is CONVENIENT for the bricklayer to HANDLE, and are provided with an exclusive strong practical mortar bond. They lay up quickly in the same manner as other masonry units. The surface of Glass Bricks cannot be easily defaced with chalk, crayons or pencil, as is the case with most other building materials.

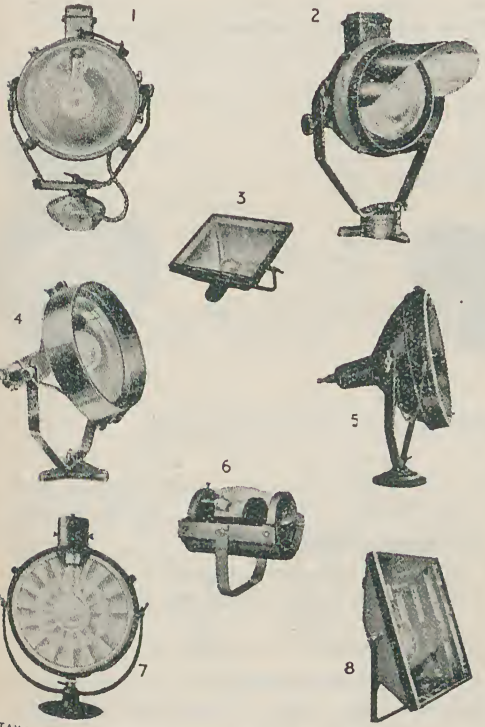
Because of the foregoing advantages Glass Bricks are being used in almost every type of building being erected to-day—in HOMES, OFFICES, FACTORIES, HOSPITALS, FLATS, HOTELS, SHOPS, RESTAURANTS, APARTMENTS, CLUBS, THEATRES, SCHOOLS, GARAGES and SERVICE STATIONS, LABORATORIES, etc. In fact, their uses are almost UNLIMITED.

It is for this reason that "Insulux" has been termed the most modern and most versatile of all constructional units.

THERE'S A PLACE IN EVERY JOB FOR "INSULUX."

FLOOD LIGHTING

Floodlighting has proved itself superior to any other alternative system as a beautifier of building facades, with its glow and shadows.



DETAILS—Nos. 1 & 2: HEAVY DUTY, NARROW BEAM PROJECTORS, USING GENERAL SERVICE LAMPS. Nos. 4 & 5: NARROW BEAM PROJECTORS, USING PROJECTOR LAMPS. Nos. 3 & 6: SPECIAL ASYMMETRIC NARROW BEAM PROJECTORS, USING PROJECTOR LAMPS. No. 7: MEDIUM BEAM PROJECTOR, USING GENERAL SERVICE LAMP. No. 8: ASYMMETRIC WIDE BEAM PROJECTOR, USING GENERAL SERVICE LAMP.

PRODUCTION OF PARALLEL BEAM

BEAM SPREAD FROM ACTUAL LIGHT SOURCE.

LIGHT CONTROL BY ASYMMETRIC REFLECTOR.

The cost of pivoted reflectors 150-200w. range from 15/- without glass to 50/- each.

Silvered metal Crazy Asymmetrical 9″ diameter reflector for windows, 9/6 ea., without gallery.

Glass mirrors and polished metal placements reflect the light.

Watson & Co., Clarence St., Sydney., Crown Crystal Glass Pty. Ltd.

The increasing requirements of **Flood-lighting** installations, viz., to exterior and interior of buildings, Docks and Sports areas, industrial areas, gardens, bathing pools, quarries, railway yards, or any field for illumination.

The strength or power to diffuse light ranges from marine long range service search-lights to interior show windows and articles for trade purposes. Making flood lighting most universal and important.

COMMERCIAL SUPPLEMENT

D 2.37

150/200-watt Window Reflectors, Silvered Glass, either Intensive or Extensive type Guaranteed against Chipping and Blistering. Complete with

Minor 100-watt Spotlight, Polished Aluminium, Adjustable Bracket 22/6
With Heat-resisting Glass. Price 32/6

150/300 Chrome-plated Copper Floodlight, complete with Diffusing Glass, Focussing Device and Lamp-holder 42/6
Non-Focussing (similar to illustration 36/6

FLOODLIGHTING AND PROJECTION LAMPS.

Watts	Voltage.	Price.
50-250	20-260	26/- ea.
500	20-260	37/- ea.

VACUUM LAMPS.

Watts	Voltage	Clear	Pearl	Natural Colour	Sprayed Colour.
15	20-260	1/6	1/6	2/9	1/9 ea.
25	20-260	1/6	1/6	2/9	1/10 ,,

Cost of Reflector and Duration.

Cost of working.—A 200 watt lamp (26/- ea.) burns for 5 hours at a cost of local unit.

Coloured sheet of gelatine, glass, mica or transparent colouring, spread at front of burner, produces tint of lighting desired.

150-300w. stationary floodlight spun copper chrome, 36/6, with diffusing glass focussing device 42/6.

The Condor Electric Discharge Lamps.

Condora sodium high pressure mercury vapour lamp 3 types, 50, 65, 100 and 150 watt rating for spaces.

The light emitted provides glareless illumination for highways and streets. Average life 2,500 hours.

GLAZIER

Glass is measured by the superficial foot, and the glazing is generally done by the firm supplying the glass.

GLASS WORKERS (STATE) AWARD, 1938.

	per Hour.
Bevellers, Bevellers' Cutters, Silverers, & Brilliant Cutters	2/5$^{3}/_{22}$
Glass Cutters, Glaziers, Lead Light Glaziers, Glass Benders	2/4$^{7}/_{11}$

¼″ Polished Plate. PRICES.	per foot Super.
Up to 2 sq. feet	2/6
Up ,, 10 feet super	3/3
10 ,, 25 ,, ,, ...	3/9
25 ,, 50 ,, ,, ...	4/–
50 ,, 75 ,, ,, ...	4/6
75 ,, 100 ,, ,, ...	5/6

Special prices for larger sizes.

$^{3}/_{16}$″ Polished Plate. (Additional) ... ... 3d.
Ground Plate ,, ... 1/–

Sheet Glass.

16 ounce. up to 70 7d. 70 to 80 8d.
21 ,, ,, ,, ,, 9d. ,, ,, ,, 9d. 80 to 100 1/1
26 ,, ,, ,, ,, 1/– ,, ,, ,, 1/2 ,, ,, ,, 1/4
32 ,, ,, ,, ,, 1/4 ,, ,, ,, 1/6 ,, ,, ,, 1/8

Plain Colours. Blue, Ruby and Green, 16 oz., 1/9
Figured Rolled. White, 1/1. Tinted, 1/9.
Cathedral. (Same as Fig.-Rolled).
Muffled. White, 2/–. Coloured, 2/6.
Rough Rolled & Rough Cast. ⅛″, 1/1. $^{3}/_{16}$″, 1/2. ¼″, 1/3.
Wired Rolled and Wired Rough Cast, 1/6.

LARGEST SIZES OF SHEET GLASS MANUFACTURED.

Weight per sq. foot.	Length.	Width.
16 ounce	60″	50″
21 ,,	60″	60″
26 ,,	72″	60″
32 ,,	84″	60″

WEIGHT OF GLASS PER SQUARE FOOT.

Thickness. Inches	⅛″	$^{3}/_{16}$″	¼″
Weight. Pounds	2	2½	3½

¼ Plate Glass weighs 4 pounds per sq. foot.

$^{3}/_{16}$″ Corrugated Rough Rolled. 72″ x 27″ 52/6 per Sheet.
60″ x 27″ 46/6 ,, ,,

SILVERED PLATE.

	per super foot.		per super foot.
Up to 2 feet Super	3/9	10 to 15 feet Super	5/3
„ 4 „ „	4/–	15 „ 25 „ „	5/9
„ 6 „ „	4/6	25 „ 50 „ „	7/–
6 to 8 „ „	4/9	50 „ 75 „ „	8/–
8 to 10 „ „	5/–		

Pennycooks Glazing Bars. (Jas. Sandy Pty. Ltd.). 3/6 Lineal foot. Shoes & Nails Extra.

BEVELLING.

	Widths ¾″	1″
Up to 10 feet	7d.	11d.
„ 12 „	8d.	1/1
„ 15 „	9d.	1/3
„ 20 „	1/–	1/10
„ 25 „	1/8	2/6

Curved Edges—Special Prices.

LABOUR.

Polishing Edges. Plate Glass under ⅜″ thick, from 7d. foot run.
Drilling Holes „ „ up to ¼″ dia. 1/– ea. ½″ 1/6 ea.

SILVERING ONLY TO PLATE GLASS. AT OWNER'S RISK.

Up to 5 feet super.	1/6
5 to 15 „ „	2/–
15 to 25 „ „	2/3
25 to 50 „ „	3/3

Bent Glass of all Descriptions is charged according to type of Glass—Size and Thickness.

LEAD LIGHT WORK.

Prices on Application.

WUNDERLICH IMPROVED GLAZING BARS.

No. 5 Including 1½″ Tee Iron & Zinc Capping, **per lin. foot** ...	2/6
” 5 Stepped for overlapping Glass „ „ „ ...	2/9
” 6 Including Galvd. Steel Undercapping and Zinc Top Capping **per lin. foot**	2/–
Brass Top and Bottom Fittings, **per set**	1/9

GLAZING SASHES.

Fixed prices for Glazing Sashes, withdrawn.

Glass Merchants submit special quotations according to quantity and type of work.

Your usual supply house will furnish this information direct on application.

VITROLITE.

Vitrolite is an opaque glass material for walls, shelves, and table tops, etc. It has a hard brilliant surface, which is lasting. Made in

numerous colours also Black and White, and is now being used extensively in bathrooms and kitchen colour schemes.

Method of fixing, prices, etc., on application, and leading Glass Merchants.

Vitroflex is something entirely new in glass decoration. Cut into units 2″ x ½″, 2″ x 1″ and 1″ x 1″ fixed on cloth for flexibility and bends both concavely and convexly. **Uses.** Columns, cornices, counter fronts, ceilings, coves, cocktail bars, balustrades, friezes, table tops, wall linings, etc. Available in many colours. Obtainable through all leading glass merchants.

CUTTING GLASS GAUGE TUBES.

The proper way is to take the point of small file and simply scratch the inside of the tube all round at the part you want it cut, and if the piece does not fall off in your hand at once, lay it aside for a little and you will find it as you want it in a very short time.

DRILLING HOLES IN GLASS.

Diameter	...	¼	⅜	½	⅝	¾	⅞	1 in.
Price	...	1/–	1/3	1/6	1/9	2/–	2/3	2/6

Pay Holes and Speaking Holes bevelled and polished to 8in., 12/6, over 8in. 15/–.

Leaded Lights. Clear, obscured tinted and Diamond, from 2/6 to 3/9 and 4/3. 3 pence per foot additional $\frac{1}{16}$ lead.

Pattern lead light 3/3 to 4/6, Floral designs, 3/9 to 5/–, Scenic, 5/6 to 10/6.

Glazed in Steel Frames, inside 3d. per foot extra, outside, 5d.

Labour. Repairing Leadlights, 4/– per hour plus material and extras.

Metal Glaze, extra to lead light prices, zinc, 1/–, copper, 1/6, oxidised, 1/9, nickel, 2/–.

WEIGHTS.

WEIGHT OF GLASS PER SQUARE FOOT.

Thickness, ins.	...	⅛	3/16	¼	⅜	½	⅝	¾	1
Weight, lbs.	...	1¾	2½	3	5	7	8½	10	13

Labour. Cutting and glazing, Wood sashes, 1d. per sq. ft. up. Steel sashes, 3d. per sq. ft. up.

Recipe to Remove Old Glass from Sashes.

Run a hot soldering iron (or other hot metal) along surface of putty to soften same, then scrape with knife or chisel.

HORNEX Rubber Compound for joint filling and adhesive purposes.

VULCATEX, for caulking between masonry, and under frames of wood and steel.

Vulcatex is a plastic mixture made from China Wood oil and Vulcanized.

This process extracts from the oil the oxidizing chemical action.

FIXING GLASS MIRRORS TO WALL.

The Rawlplug Method.

(from Modern Fixing Practice).

A typical example is the fixing of mirrors which make so important a contribution to the decoration of the modern cinema. Leading architects usually specify that the mirrors shall be backed with plywood and this may be taken as the best method. The first essential is to get down to solid. If the situation is one in which the craftsman can get down to the brick or concrete wall, the job is simple. The requisite number of holes may first be drilled in the plywood backing—one at each corner suffices for a small mirror—and the plysheet may then be held against the wall in the required position and the wall marked through the drilled holes. The backing is then removed, holes punched in the wall at the spots marked and rawlplugs inserted. When the screws have been driven home nothing will shift such a backing ; and the mirror is then mounted on it by means of ornamental clips. To ensure that the screws enter the Rawlplugs centrally, it is sometimes convenient to make the screwholes in the plywood backing somewhat larger than the screw requires, the screws being used with washers and the holes in the plywood countersunk sufficiently to accommodate screw head and washer together. A simple way to accomplish this is to bore holes in the wood and then drill holes through the wood—insert plugs and screw home.

For prices of Rawlplugs refer page 111.

NEON TUBE LIGHTS

Containing Special *Gas* Illuminated by the *Aid* of *Electricity*.

CLAUDE NEON FOR THE BUILDER AND ARCHITECT.

The Builder will find **four uses** for neon illumination.

1. The Box-Sign. 2. Roof Top. 3. Neon Outlining. 4. Concealed Neons.

The box signs have their mechanism completely protected by a metal box, and may be safely erected wherever desired.

These signs are available with **standard-sized boxes in four, six and eight foot lengths,** with a uniform depth of **one foot.** They may be obtained in any design, any lettering and any colour selected by the client.

Box-signs are usually installed beneath the awnings of shops. The height above the footpath is usually about nine feet, installed in two different ways.

One is to hang the sign from the awning by means of two lead pipes.

The other is to bolt the box itself directly to the awning or shop-front.

Smaller box signs may be used **inside shops** as direction-pointers, department-indicators, etc.

The **vertical box-sign** may be fixed directly to the face of any structure, limited only by the height of the building.

Box-signs with interchangeable " **Claude Silhouette** " letters may be safely recommended for the use of shops and theatres. Each sign of this type is supplied with a complete font of letters, so that any desired message may be conveyed.

2. Roof-top Signs :

Large signs erected upon the roofs of shops and factories are usually of skeleton design ; that is, the metal background of the tubing, instead of forming a complete rectangle, is shaped in the form of the lettering.

3. Neon Outlining :

Is admirably suited to both outdoor and indoor illuminations. The method of installation is the same in either case. Shaped to fit by small, saddle-like supports, about one-and-a-quarter inches long. At the base of each saddle is a metal clip which may be screwed into any wooden, plaster, concrete or fibrous surface.

Outdoor use, neon tubing may form an artistic border for the facade of any building. Every Claude Neon outlining unit, is made to measure.

4. Concealed Neon : tubes beneath opalescent glass may be used to advantage indoors. An even glow, spread over the surface of the glass, forms an excellent illuminant for theatres, emporiums, arcades, and private homes. **Neon is a diffused source** of light and casts but little shadow.

Range of Colours includes the following: Red, Amber, yellow, pale blue, blue, helium, gold, orange, pink, salmon-pink, mauve, apple-green, green, white.

Prices.

Quotations vary with the **colours** required, **degree** of **brilliancy of tubes,** etc. It is safe to say as a general rule, however, that **the cost of erection and maintenance of** neon outlinings **over a period of five years will lie between twenty and thirty shillings per hundred feet of tubing per month.** It is impossible to give a standard price-scale for box signs, but all possible information concerning prices, colours, sizes, types of lettering, and erection methods, can be had from

Claude Neon Ltd.
2 Alison Road, Randwick.

Forty to forty-five feet of neon tubing burns approximately one quarter unit of electric current per hour, more or less, depending upon the diameter of the tubing used.

Most neon signs in general use operate from 240 volts alternating current, the transformer voltage in the secondary circuit ranging from 7,000 to 15,000 volts.

READY RECKONER

For Calculating the Cost of Electric Light Wire.

Per mile	Per 110 yds.	Per mile	Per 110 yds.
s. d.		£ s. d.	
5 0	3¾	1 0 0	1/3
5 6	4¼	2 0 0	2/6
6 0	4½	3 0 0	3/9
6 6	5	4 0 0	5/–
7 0	5¼	5 0 0	6/3
7 6	5¾	6 0 0	7/6
8 0	6	7 0 0	8/9
8 6	6½	8 0 0	10/–
9 0	6¾	9 0 0	11/3
9 6	7¼	10 0 0	12/6
10 0	7½	11 0 0	13/9
10 6	8	12 0 0	15/–
11 0	8¼	13 0 0	16/3
12 0	9	14 0 0	17/6
13 0	9¾	15 0 0	18/9
14 0	10½	16 0 0	20/–
15 0	11¼	17 0 0	21/3
16 0	1/–	18 0 0	22/6
17 0	1/ 0¾	19 0 0	23/9
18 0	1/ 1½	20 0 0	25/–
19 0	1/ 2¼	21 0 0	26/3

Note.—Coils of 100 yards would be 1/11th less than above.

INDIA RUBBER

Corrugated and Pyramid Rubber Matting.

For Shop Doorways, Treads, Bathrooms, Landings.

Sheets, 3ft. wide, $\frac{1}{8}$, $\frac{3}{16}$, $\frac{1}{4}$in. thick. Pyramid, $\frac{1}{8}$in. only.

Weight of rubber varies according to quality quoted, but the general average :—$\frac{1}{8}$in. thick = 1lb. per sq. ft., $\frac{3}{16}$in. thick = 1½lb. per sq. ft., $\frac{1}{4}$in. thick = 2lbs. per sq. ft. **Price**, 2/– per lb.

Sheet rubber, plain or metallic, $\frac{1}{32}$in. to $\frac{3}{16}$in. thick, 3/9 to 4/–. per lb.

RUBBER FLOOR COVERING.

Rubber Floor Covering is used in hospitals, offices, shops, residences corridors of ships and on all floors where silence is essential.

Made in all kinds of colours and special carpet patterns.

Available in two thicknesses, $\frac{1}{8}$″ thick, 17/6 and $\frac{3}{16}$″ thick, 23/– per sq. yd. fixed.

Rubber flooring sponge for under, rubber matting etc., $\frac{3}{16}$″ thick, 10/– and $\frac{1}{4}$″ thick, 11/6 per sq. yd. fixed.

Rubber Combined "Stair" treads and "nosings" for steps and stairs, 4/6 per lineal foot laid.

Rubber Sheeting made in red, green or white :—

Thickness.	Weight per sq. ft.	Price per lb.
$\frac{1}{16}$in.	½lb.	4/10
$\frac{1}{8}$in.	1lb.	4/4
$\frac{3}{16}$in.	1½lb.	3/8

See Advt., p. 16A.

India Rubber Delivery Hose	¾″	1″	1¼″	1½″	2″
Rubber delivery Hose, 3 ply per foot	1/3	1/7	1/10	2/1	3/1
Suction Hose-Air & Water 3 ply per foot	2/1	2/8	3/5	3/10	5/–
Oxy-Acetylene Hose			¼″	$\frac{5}{16}$″	⅜″
3 ply			–/10	–/11	1/–
4 ply			1/–	1/1	1/2

Hose measurements always internal diameter.

Rubber Boots (gum knee) for wet sinking, 37/6 pair.

RUBBER GLOVES.

Tested	Short White	Red	Gauntlet	White	Red
1000 volts ...	7/8	7/4		9/10	9/5
2500 volts ...	8/1	7/8		11/2	10/9
5000 volts ...	9/1	8/10		12/3	11/5

Hand made gauntlet to 11000 volts, 12/9.

Diving Apparatus complete in the Australian cities from £150 to £200.

For further, see Advt., p. 16A.

IRONWORKER AND SMITH

MEASUREMENT.

All Smiths' and Cast Work is measured and generally valued by weight. The work should be measured in detail, and the weight ascertained by reference to the various tables given, or by roughly allowing 465lbs. to the foot cube. The patterns for castings are charged extra. The weight of castings may be ascertained from weight of pattern multiplied by table of constants as under for different metals. All screws and bolts—holes drilled, &c., should be *numbered*. Heavy castings should be kept separate from light or ornamental work.

Crestings and railings, &c., are usually taken by *the foot run*.

All work that has to be hoisted must be kept separate and charged for according to handling and height to be raised.

Wrought iron or steel framing work is also measured and charged by weight; all hoisting to be treated as above described. In the case of iron-framed roofs and R.S. joist framing the weight is generally taken and valued according to the amount of work in executing same. In smiths' work, such as railings, guard-bars to windows, &c., the plan is frequently adopted of giving the weight of the metal, reckoning all the labors in addition.

Light Grill and **Open** or **Mesh Work** Panel Work for Elevators, Gates, Staircases and Lift Wells are generally reckoned by the super foot.

Steel Windows and **Casement Frames** by the opening. Rolled steel mesh work generally by the super foot according to work.

MEMORANDA.

Test for Iron.—A soft tough iron, if broken gradually, gives long silky fibres of leaden-grey hue, which twist together and cohere before breaking.

Badly refined iron gives a short blackish fibre on fracture, a very fine grain denotes hard, steely iron, likely to be cold-short.

A medium, even grain, with denser fibres, shows good iron.

Iron remains bright if touched with nitric acid.

Test for Steel.—Good steel in its soft state has a curved fracture and a uniform grey lustre; in its hard state a dull silvery uniform white.

Nitric acid will produce a black spot on steel; the darker the spot the harder the steel.

Cracks, threads, or sparkling particles denote bad quality.

Poldi N Steel for cold chisels.

Test after a blunt chisel had been sharpened by a fine file only (not wrought or tempered after as is usual). No impression was made on the edge of chisel after 2 minutes cutting a hard steel motor bearing. —C.E.M.

Good steel will not bear a white heat without falling to pieces, and will crumble under the hammer at a bright red heat, while at a

middling heat it may be drawn out, under the hammer, to a fine point. Care should be taken that before attempting to draw it out to a point the fracture is not concave, and should it be so, the end should be filed to an obtuse point before operating. Steel should be drawn out to a fine point and plunged into cold water ; the fractured point should scratch glass.

To test its toughness, place a fragment on a block of cast-iron ; if good, it may be driven by a blow of a hammer into the cast-iron ; if poor, it will crush under the blow.

Testing Girders.—The easiest and cheapest way to test girders in pairs is to dig a trench longer and wider than the girders, which are laid in the trench with sufficient space between them to insert an hydraulic lift in the centre, the ends being easily fixed with wooden blocks ; by pumping to exactly the pressure required each girder is fully tested.

Approximate weight of Castings from the Pattern.—The weight of pattern in lbs. multiplied by *constants* given, will give the weight of casting in lbs. for the following metals :—

	C. Iron.	Zinc.	Brass.	Copper.	G. Metal.	Lead
White Pine or Deal, dry	14	15	18	19	19	25
Yellow Pine, dried ...	14	14	17.5	18	18	24
Clay dried (model) ...	4	3.8	4.4	4.6	4.6	6
Plaster of Paris, ditto	3.3	3.2	3.7	3.8	3.8	5

COST OF STEEL.

Per Single Pound at per Ton.

M. S. Stanley, C.E.

Cost per Ton £	Cost per Pound. Pennies	Cost per ton £	Cost per pound. Pennies
10	1.07	21	2.25
11	1.18	22	2.36
12	1.29	23	2.47
13	1.39	24	2.57
14	1.5	25	2.68
15	1.61	26	2.79
16	1.72	27	2.89
17	1.82	28	3.0
18	1.93	29	3.11
19	2.03	30	3.21
20	2.14		

Average diff. per £1 = .11 pence.

WROUGHT IRON

	From s. d.	To s. d.
Straps or T. hinges, with hooks and bolts per lb.	0 9	0 10
Screw bolts, nuts and washers, and king-post stirrups	0 8	0 9
Pile shoes, with straps and nails	0 6	0 9
Framed grating for sewers and sink-stones	0 6	0 8
Cradle bars, framed, 4d., ditto, trussed with screws and nuts	0 8	0 9
Gates, Ornamental, each hung, from		£5 0 0
Galvanising wrought iron, extra per cwt.	18 0	24 0

SPECIAL WROUGHT IRON WORK.

Gates, staircasing, per super foot	9	0	upwards
Ornamental railings, for balconies, galleries, &c., per super foot	10	6	,,
Heavy railing or guard rails, for basement windows, and plain grills, per super. foot	9	0	,,
Balusters, for staircases, each, ornamental, from	10	0	,,
Ornamental wrought iron work, for grilles, railings, lift enclosures, &c., according to design, per sup. ft., from	10	0	,,

Interlaced Iron Meshwork.

For Lift enclosures, offices—all gauges, per super ft.	s.	d
$1\frac{1}{8}$in. Plain mesh, $\frac{1}{4}$ x 1/20in. iron ...	5	0
$1\frac{1}{8}$in. ,, $\frac{3}{8}$ x 1/16in. ,, from	3	6
$1\frac{1}{4}$in. double strand $\frac{1}{4}$ x 1/20 in.	5	9
$1\frac{1}{4}$in. ,, $\frac{3}{8}$ x 1/16in. from ...	3	9

In consequence of the great variety of shapes, sizes, sections, and qualities, it is impossible here to quote prices in detail.

SQUARE AND ROUND IRON.—Per Foor Run.

at 2d. per lb., or 18/8 per cwt.

In.	Square. s. d.	Round. s. d.	In.	Square. s. d.	Round. s. d.	In.	Square. s. d.	Round. s. d.
$\frac{1}{4}$	0 $0\frac{1}{2}$	0 $0\frac{1}{2}$	$1\frac{1}{8}$	0 $8\frac{1}{2}$	0 7	2	2 3	1 9
$\frac{3}{8}$	0 1	0 1	$1\frac{1}{4}$	0 $10\frac{1}{2}$	0 $8\frac{1}{2}$	$2\frac{1}{8}$	2 6	2 0
$\frac{1}{2}$	0 2	0 $1\frac{1}{2}$	$1\frac{3}{8}$	1 1	0 10	$2\frac{1}{4}$	2 10	2 $2\frac{1}{2}$
$\frac{5}{8}$	0 $2\frac{1}{2}$	0 2	$1\frac{1}{2}$	1 3	1 0	$2\frac{3}{8}$	3 2	2 6
$\frac{3}{4}$	0 4	0 3	$1\frac{5}{8}$	1 6	1 2	$2\frac{1}{2}$	3 6	2 9
$\frac{7}{8}$	0 5	0 4	$1\frac{3}{4}$	1 $8\frac{1}{2}$	1 4	$2\frac{5}{8}$	3 10	3 0
1	0 $6\frac{1}{2}$	0 5	$1\frac{7}{8}$	1 $11\frac{1}{2}$	1 $6\frac{1}{2}$	$2\frac{3}{4}$	4 $2\frac{1}{2}$	3 3

For varying prices, multiply or add to the above, viz., 3d. per lb. add 50 per cent.; 4d. per lb. x 2; 5d. per lb., multiply by 2½ times; 6d. x 3 for each kind, square or round.

CHUBBS STEEL STRONG ROOM DOORS WITH ANGLE FRAME.

Hung on hard steel centres, fitted with Working Bolts on front edge and a continuous Locking Bar on the back edge for security. The Doors are fitted with a Fire-Resisting Chamber filled with the best known Fire-Resisting material.

The Working Bolts are secured with Chubb Unpickable Locks with keys in duplicate. Chubb compensating Device is attached to the locks so as to secure the Working Bolts in the event of the locks being displaced by attack.

Each Door is fitted with a Lock Case Locking Device.

Stock Sizes Outside of frame Measuring.	Light Fire Resisting 1 lock.	Tenants 1 lock.	Commerce 1 lock.	Mod. Standard 2 locks.
6′ x 2′ 6″	£28	£40	£55/–/–	
6′ 3″ x 2′ 9″	—	—	£73/–/–	£90/–/–
6′ 6″ x 3′ 0″	—	—	—	£100

If fitted with Keyless Combination Lock, £10 extra per lock.

CHUBB ADJUSTABLE STEEL SHELVING FOR STRONGROOMS.

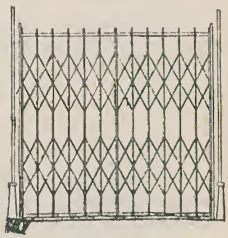
(Prices on Application).

COLLAPSIBLE STEEL GATES AND SHUTTERS.

For shop fronts, entrances, lift doors, &c., of public, private, or business premises; expanded measurement per sup. ft.:—

Gates manufactured of ½in. channel steel.

	s.	d.
Area up to 35 sq. ft.	10	6
,, 50 ,, ...	9	6
,, 70 ,, ...	8	6
,, 100 ,, ...	8	0



If Gates ⅝in. channel section, add 1/– per sup. ft. to above prices, if hinged, 1/2.

Standards complete with socket pieces, dust covers and necessary stays, each 35/–.

Weight of Gates, ½in. channel, 4lbs. per ft.; ⅝in. channel, 5lbs. per ft.

SPACE CERTAIN SIZE GATES OCCUPY WHEN COLLAPSED.

For Small Openings or Window Guards.

½in. Pickets at 4½in. Spacing Size Ft.	Ins.	Collapsed Ins.	⅝in. Pickets at 4½in. Spacing Size Ft.	Ins.	Collapsed Ins.
2	1½	3¼	2	2	4
2	6½	3¾	2	8	4½
2	11⅓	4¼	3	0	5¼
3	4½	4¾	3	6	6
3	9½	5¼	3	11	6⅓
4	2½	5¾	4	4	7¼
4	7½	6¼	4	9	7¾
5	0½	6¾	5	2½	8½
5	5½	7¼	5	7	9
5	10½	7¾	6	0½	9½
6	3½	8¼	6	5½	10¼
6	8½	8¾	6	10½	11
7	1½	9¼	7	4	11½
7	6½	9¾	7	9	12¼
7	11½	10¼	8	2	12¾
8	4½	10¾	8	7	13½
8	9½	11¼	9	0	14
9	2½	11¾	9	5½	14¾
9	7½	12¼	9	10½	15¼
10	0½	12¾	10	3½	15¾
10	5½	13¼	10	9	16½
10	10½	13¾	11	2	17¼
11	3½	14¼	11	7	18

The above calculations do not apply to Lift Cages, the spacing for which are about 4in.

If made to hinge aside, add 2¼ in. and 2½in. extra if with lifting bottom track.

WROUGHT STEEL.

The use of Steel for ordinary constructional purposes aided by improved machinery has completely displaced wrought iron, at about the same cost, and as it possesses much greater tensile strength than this, it is obviously more economical to use it.

ROOFS.

Labor at 2/9 per hour.

Roofs with trussed principals and purlins of ordinary spans, framed of tees, angles, flat bars, &c., including all holes, bolts, base plates, connections, &c., complete, and including erection 35/– per cwt. upwards.

Rolled Steel Joists, cut to lengths, from 20/– per cwt. upwards.

Rolled Steel Joists, Framed Reinforcement, for buildings—

Girders, from 14s. 3d. per cwt. Stanchions from 17s. per cwt. Labor on above and profit—8/– to 16/–.

WROUGHT IRON.

Per cwt., Subject to Market Fluctuations.

	s. d.		s. d.
Wrought bar, round or half-round iron ...	15 0	to	16 0
Sheet Iron, 18 to 24 gauge	28 6	to	35 0
Angle T and channel iron			27 6

N.B.—Prices Uncertain.

WROUGHT IRON.	From	To
Fixed, per lb.	s. d.	s. d.
Wharves and Bridges.—Wt. iron in straps, shoes, rings and straps of piles, anchor and other bolts and dumps for planking wharves ...	0 6	0 9
Bolts.—From 15in. to 36in. long, including tie-bolts for king posts	0 6	0 9
Wrought Iron cell doors for gaols, including hinges, straps, staples and fastenings, fixed complete, about £10 each or	1 0	1 6
Plain square balusters for stairs, &c., per lb. ...	0 6	0 9
Iron hand rail and square balusters, including fixing and lead	1 0	1 6
Iron roofs complete, including angle, T. and rod iron for rafters, struts, king and queen posts, tie-rods, &c.	0 6	0 8
Gates and Girders—		
Framed gates, with hinges fixed, per lb. ...	0 9	1 0
Wrought iron plate and box girders, colonial	£25 to £28 per ton	

WROUGHT IRON.

Labor.

Hanging a pair of iron gates with portable or other crane, gates about 3 tons, 8 men, 10 hours, at 3s. per hour	£10	to	£12		
Hanging single or side-gates, with above, everything prepared, for drilling and leading into stone piers, hanging and lock stiles, 2 men, 9 hours each	£3	to	£5		
	s.	d.		s.	d.
Guard bars, with strap ends, unframed, for windows of stores, gaols, &c., per lb.	0	8	to	0	10
Strong brackets, framed with braces	1	0		1	4
Iron work for pumps	1	2		1	6
Plate Iron Tanks	0	6		0	7
Chimney and Arch Bars	0	6		0	7
Ties and straps in floors and roofs	0	8		0	10

WEIGHT OF 100 IRON PAN-HEADED RIVETS IN LBS.
Length under head to point.
Diameter of Rivets in inches.

	5-16	6-16	7-16	8-16	9-16	10-16	12-16	14-16	1in.
ins.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
½	2.06	3.26	4.83	6.82	9.28	12.25	19.94	30.8	43.63
⅝	2.33	3.64	5.35	7.50	10.14	13.32	21.48	32.36	46.36
¾	2.60	4.03	5.87	8.18	11.00	14.38	23.01	34.45	49.09
⅞	2.86	4.41	6.39	8.86	11.86	15.45	24.54	36.54	51.81
1	3.13	4.79	6.92	9.54	12.73	16.51	26.08	38.63	54.54
1¼	3.66	5.56	7.96	10.91	14.45	18.64	29.15	42.80	60.00
1½	4.19	6.33	9.00	12.27	16.18	20.77	32.21	46.98	65.45
1¾	4.73	7.09	10.05	13.64	17.91	22.90	35.28	51.16	70.90
2	5.26	7.86	11.09	14.99	19.63	25.03	38.35	55.33	76.36
2¼	5.79	8.63	12.14	16.36	21.36	27.17	41.42	59.51	81.81
2½	6.32	9.40	13.18	17.73	23.08	29.30	44.49	63.68	87.27
2¾	6.86	10.17	14.22	19.09	24.81	31.43	47.55	67.86	92.72
3	7.39	10.93	15.27	20.45	26.53	33.56	50.62	72.04	98.18
3¼	7.92	11.70	16.31	21.82	28.26	35.69	53.69	76.21	103.63
3½	8.45	12.46	17.36	23.18	29.99	37.82	56.76	80.39	109.08
3¾	8.99	13.23	18.40	24.54	31.71	39.95	59.8	84.56	114.54
4	9.52	14.00	19.44	25.91	33.44	42.08	62.89	88.74	119.99

Useful Cements.

Rust for Iron.—Wrought iron filings, 65 parts ; sal-ammoniac, 2½ ; sulphur (flowers), 1½ ; sulphuric acid, 1. Mix dry, sulphuric acid with sufficient water then added.

Iron Pipes.—Wrought-iron filings, 45 parts : clay, 20 ; china clay, 15 ; common salt solution, 8. If china clay cannot be found, fireclay will do.

ROLLED STEEL JOISTS.

WEIGHT OF STEEL JOISTS, AND SAFE CARRYING LOAD.

Price Standard Sections 15/- *to* 17/- *per cwt.*

A = Depth of Joist. C = Thickness of web.
B = Width of Flange. D = Thickness of Flange.

Dimensions in Inches and diameter				Weight per foot run	Safe Load in Tons Distributed for Clear Spans of						
A	B	C	D	lbs.	6ft.	8ft.	10ft.	12ft.	16ft.	20ft.	30ft.
3	1½	.16	.248	4.0	0.92	—	0.55	0.46	—	—	—
3	3	.20	.332	8.5	2.0	—	1.2	1.0	—	—	—
4	1¾	.17	.24	5.0	1.5		0.91	0.76	—	—	—
4	3	.22	.336	9.5	3.1	2.5	1.9	1.6	—	—	—
4¾	1¾	.18	.325	6.5	2.4	—	1.4	1.2	—	—	—
5	3	.22	.376	11.0	4.5	3.6	2.7	2.3	1.7	—	—
5	4½	.29	.448	18.0	7.6	—	4.5	3.8	2.8	—	—
6	3	.26	.348	12.0	5.6	4.5	3.4	2.8	2.1	—	—
6	4½	.37	.431	20.0	9.6	—	5.8	4.8	3.6	—	—
6	5	.41	.520	25.0	12.0	—	7.3	6.0	4.5	—	—
7	4	.25	.387	16.0	9.4	—	5.6	4.7	3.5	2.8	—
8	4	.28	.402	18.0	11.0	—	7.0	5.8	4.3	3.5	—
8	5	.35	.575	28.0	18.0	—	11.0	9.9	7.0	5.5	—
8	6	.44	.597	35.0	23.0	—	14.0	11.0	8.6	7.0	—
9	4	.30	.460	21.0	15.0	—	9.0	7.5	5.6	4.5	—
9	7	.55	.924	58.0	42.0	—	25.0	21.0	16.0	12.0	—
10	5	.36	.552	30.0	24.0	—	14.0	12.0	9.0	7.2	—
10	6	.40	.736	42.0	35.0	—	21.0	17.0	13.0	10.0	—
10	8	.60	.970	70.0	53.0	—	34.0	28.0	21.0	17.0	—
12	5	.35	.550	32.0	30.0	—	18.0	15.0	11.0	9.0	—
12	6	.40	.717	44.0	40.0	—	26.0	22.0	16.0	13.0	—
12	6	.50	.883	54.0	52.0	—	31.0	26.0	19.0	15.0	10.0
14	6	.40	.698	46.0	43.0	—	31.0	26.0	19.0	15.0	10.0
14	6	.50	.873	57.0	59.0	—	38.0	31.0	24.0	19.0	12.0
15	5	.42	.647	42.0	47.0	—	28.0	24.0	18.0	14.0	9.5
15	6	.50	.880	59.0	62.0	—	42.0	35.0	26.0	21.0	14.0
16	6	.55	.847	62.0	73.0	—	45.0	38.0	28.0	22.0	15.0
18	7	.55	.928	75.0	—	—	64.0	53.0	40.0	32.0	21.0
20	7½	.60	1.01	89.0	—	—	83.0	69.0	52.0	41.0	27.0
24	7½	.60	1.07	100.0	—	—	102.0	92.0	69.0	55.0	36.0

Span should not exceed 20 times the depth of single joist.

Example for reading above table :—10 x 8 joist, with thickness wet .60 inch, flange .97, weighs 70 lb. per foot run. Safe distributed load for 10 feet span is 34 tons ; for 16 feet span, 21 tons. Calculated a quarter the breaking strain

B.H.P. COLONIAL MANUFACTURERS.

Price Material for Structures.
Rolled Steel Joists.

R.S.J. per cwt., 15/– to 17/–.
Channel Irons, 15/– to 18/– up to 45 feet run.
Angle Iron, 15/– to 17/–.
Imported T Iron, 25/– per cwt.
For **Bolts and Nuts,** *see* Table.

Thickness	Weight of Steel Girder Plates, per ft. run.						
	¼in.	5/16in.	⅜in.	½in.	⅝in.	¾in.	⅞in.
Width	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
8 inches ...	7	8⅞	10⅔	14	17¾	21	24¾
9 ,, ...	8	9¾	12	16	19¼	24	27¼
10 ,, ...	8¾	11	13½	17½	22	27	30¾
12 ,, ...	10½	13¼	16	20¾	25½	32	36¾
14 ,, ...	12¼	15¼	18	24½	30	36	42¼
15 ,, ...	13	16½	20	26	33	40	46
16 ,, ...	14	17¾	21⅓	28	35½	42	49½
18 ,, ...	16	19⅞	24	31	38½	48	54½
20 ,, ...	17½	22	27	35	44	54	61½
24 ,, ...	21	26½	32	41½	51	64	72

SERVICE BOLTS AND NUTS.

Square Head and Nut—Round Neck.

Australian Standard prices at per 100—Broken Packages.

Length.	¼″	5/16″	⅜″	½″	⅝″	¾″	⅞″	Inch.
2	6/5	8/3	10/9	15/2	25/–	36/3		
2½	7/–	8/9	11/10	16/–	26/6	38/–		
3	7/8	9/6	13/–	17/–	27/6	39/6		
3½	8/3	10/2	14/3	18/2	28/9	43/–		
4	8/9	10/9	15/6	19/3	30/3	44/–	57/3	
5	11/–	13/6	16/6	21/6	32/–	46/3	60/6	
6	12/9	16/9	17/6	24/–	34/–	48/6	63/9	
7			18/9	26/–	36/3	50/6	69/9	
8			19/9	27/–	39/–	52/9	76/–	
9			20/9	28/–	42/6	56/–	81/6	
10			22/–	29/9	45/–	61/6	88/–	

SPIKES.

Weight of 1000 Iron Spikes of different lengths.

	lbs.		lbs.
5in. long.	190	8in. long	525
6in. long	262	9in. long	626
7in. long	375	10in. long	900

NAILS.

Number of Diamond Head Nails in a 7lbs. packet.
Different lengths and gauges.

In. Gauge.	Approx. Number.	In. Gauge.	Approx. Number.
1 x 16	7400	2½ x 11	910
1 x 15	5600	2½ x 10	700
1 x 14	5000	2½ x 9	560
1½ x 14	2300	2½ x 8	455
1½ x 12	1680	3 x 10	567
1½ x 11	1440	3 x 9	469
1¾ x 11	1225	3 x 8	420
2 x 14	1860	3 x 7	336
2 x 13	1710	3 x 6	273
2 x 12	1330	3½ x 8	308
2 x 11	1064	3½ x 7	280
2 x 10	840	4 x 7	245
2 x 9	700	4 x 6	210
2½ x 13	1400	5 x 5	147
2½ x 12	1050	6 x 4	91

HOOP IRON.

Weight & Dimensions.
per foot run.

BW Gauge	Width	Weight	B.W. Gauge	Width	Weight
11	2¾	1.1577	15	1⅜	.3334
12	2½	.9178	16	1½	.3120
12	2	.7342	16	1¼	.2652
13	2¼	.7123	17	1⅛	.2084
13	2	.6332	18	1	.1616
13	1¾	.5540	19	⅞	.1237
14	1¾	.4715	20	¾	.0884
14	1½	.4042	21	⅝	.0694
15	1½	.3637			

BIRMINGHAM WIRE GAUGE.

Comparative Sizes.

No.	1	4	7	11	16	22	
	5-16	¼	3-16	⅛	1-16	1-32	gauges = of an inch.

TABLE exhibiting the weight of a lineal foot of square and round Bar Iron.

Side and diam. in inches	Square in lbs.	Round in lbs.	Side and diam. in inches	Square in lbs.	Round in lbs.	Side and diam. in inches	Square in lbs.	Round in lbs.
$\frac{1}{4}$	.21	.16	$1\frac{1}{2}$	7.52	5.91	$3\frac{1}{2}$	40.92	32.17
$\frac{5}{16}$	.33	.26	$1\frac{5}{8}$	8.83	6.93	$3\frac{5}{8}$	43.89	34.47
$\frac{3}{8}$	.47	.37	$1\frac{3}{4}$	10.23	8.04	$3\frac{3}{4}$	46.97	36.90
$\frac{7}{16}$	.64	.50	$1\frac{7}{8}$	11.74	9.22	$3\frac{7}{8}$	50.15	39.93
$\frac{1}{2}$	.84	.66	2	13.36	10.50	4	53.44	41.98
$\frac{9}{16}$	1.06	.83	$2\frac{1}{8}$	15.08	11.85	$4\frac{1}{8}$	56.83	44.64
$\frac{5}{8}$	1.31	1.03	$2\frac{1}{4}$	16.91	13.28	$4\frac{1}{4}$	60.33	47.39
$\frac{11}{16}$	1.58	1.24	$2\frac{3}{8}$	18.84	14.80	$4\frac{3}{8}$	63.93	50.21
$\frac{3}{4}$	1.88	1.48	$2\frac{1}{2}$	20.88	16.40	$4\frac{1}{2}$	67.64	53.13
$\frac{13}{16}$	2.21	1.73	$2\frac{5}{8}$	23.12	18.15	$4\frac{5}{8}$	71.45	56.11
$\frac{7}{8}$	2.56	2.01	$2\frac{3}{4}$	25.26	19.84	$4\frac{3}{4}$	75.36	59.19
$\frac{15}{16}$	2.94	2.31	$2\frac{7}{8}$	27.61	21.68	5	83.51	65.59
1	3.34	2.62	3	30.07	23.65	$5\frac{1}{4}$	92.46	72.62
$1\frac{1}{8}$	4.23	3.32	$3\frac{1}{8}$	32.62	25.62	$5\frac{1}{2}$	101.04	79.37
$1\frac{1}{4}$	5.22	4.10	$3\frac{1}{4}$	35.28	27.71	$5\frac{3}{4}$	110.43	86.73
$1\frac{3}{8}$	6.32	4.96	$3\frac{3}{8}$	38.05	29.88	6	120.24	94.61

WEIGHT OF BOLT HEADS AND NUTS IN LBS.

Diam. of Bolts in ins.	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2	$2\frac{1}{2}$	3
Weight of Hex. nut and head	.017	.057	.128	.267	.43	.73	1.10	2.14	3.78	5.6	8.75	17.	28.8
Do. Square nut and head	.021	.069	.164	.32	.55	.88	1.31	2.56	4.42	7.2	10.5	21.	36.4

LYSAGHT'S IRON TABLE.

Weight of Round and Square Iron and Steel.

Size (dia.)	IRON.		STEEL.	
	Round Weight per lineal foot	Square Weight per lineal foot	Round Weight per lineal foot	Square Weight per lineal foot
3/16	0.092	0.117	0.094	0.120
1/4	0.164	0.218	0.157	0.213
5/16	0.256	0.326	0.261	0.332
3/8	0.368	0.469	0.376	0.478
7/16	0.501	0.638	0.511	0.651
1/2	0.654	0.833	0.668	0.849
9/16	0.828	1.062	0.845	1.067
5/8	1.023	1.302	1.043	1.328
11/16	1.237	1.576	1.262	1.607
3/4	1.473	1.875	1.502	1.912
13/16	1.728	2.201	1.763	2.245
7/8	2.004	2.552	2.044	2.603
15/16	2.301	2.930	2.347	2.988
1	2.618	3.333	2.670	3.400
1 1/8	3.313	4.219	3.380	4.303
1 1/4	4.091	5.208	4.172	5.312
1 3/8	4.950	6.302	5.049	6.428
1 1/2	5.890	7.500	6.008	7.750
1 5/8	6.913	8.802	7.051	8.978
1 3/4	8.018	10.208	8.178	10.412
1 7/8	9.204	11.719	9.388	11.953
2	10.472	13.333	10.681	13.600
2 1/8	11.82	15.05	12.06	15.35
2 1/4	13.25	16.87	13.52	17.21
2 3/8	14.77	18.80	15.06	19.18
2 1/2	16.36	20.83	16.69	21.25
2 5/8	18.04	22.97	18.40	23.43
2 3/4	19.80	25.21	20.19	25.71
2 7/8	21.64	27.55	22.07	28.10
3	23.56	30.00	24.03	30.60
3 1/4	27.65	35.21	28.21	35.91
3 1/2	32.07	40.83	32.71	41.65
3 3/4	36.82	46.87	37.55	47.81
4	41.89	53.33	42.73	54.40
4 1/4	47.29	60.21	48.23	61.41
4 1/2	53.01	67.50	54.07	68.85
4 3/4	59.07	75.21	60.25	76.71
5	65.45	83.33	66.76	85.00
5 1/2	79.19	100.83	80.78	102.85
6	94.25	120.00	96.13	122.40

WEIGHT OF 100 BOLTS AND NUTS.
IN Lbs. and Decimals.
Length of Bolt in inches.

Heads & Nuts	2	2½	3	3½	4	4½	5	5½	6	6½	7
¼″ dia. Hexagon	4.36	5.	5.7	6.3	7.	7.7	8.36	9.	9.7	10.3	11.
¼″ dia. Square	4.7	5.4	6.1	6.7	7.4	8.1	8.7	9.4	10.1	10.7	11.4
⅜″ dia. Hexagon	11.8	13.4	14.9	16.4	18.	19.6	21.1	22.6	24.2	25.7	27.2
⅜″ dia. Square	13.	14.6	16.1	17.6	19.2	20.8	22.3	23.8	25.4	26.9	28.4
½″ dia. Hexagon	23.8	26.5	29.3	32.	34.7	37.6	40.2	43.	45.8	48.5	51.2
½″ dia. Square	27.4	30.1	32.9	35.6	38.3	41.2	43.8	46.6	49.8	52.1	54.8
⅝″ dia. Hexagon	43.8	48.1	52.4	56.7	61.	65.4	69.6	73.9	78.2	82.4	86.7
⅝″ dia. Square	49.1	53.4	57.7	62.	66.3	70.7	74.9	79.2	83.5	87.7	92.
¾″ dia. Hexagon	67.6	73.	80.	86.1	92.3	98.	104.	111.	117.	123.	129.
¾″ dia. Square	79.6	85.	92.	98.1	104.	110.	116.	122.	129.	135.	141.
⅞″ dia. Hexagon	106.	114.	123.	131.	140.	148.	156.	165.	173.	182.	194.
⅞″ dia. Square	121.	129.	138.	146.	155.	163.	171.	180.	188.	197.	205.
1″ dia. Hexagon	153.	164.	175.	185.	196.	208.	218.	229.	240.	251.	262.
1″ dia. Square	174.	185.	196.	206.	217.	229.	239.	250.	261.	272.	283.

WEIGHT OF 100 BOLTS AND NUTS (Continued).
In Lbs. and Decimals.
Length of Bolt in inches.

	8	9	10	11	12	13	14	15	16	17	18
¼″ dia. Hexagon	12.3	13.7	15.	16.3	17.7	19.	20.3	21.7	23.	24.3	25.7
¼″ dia. Square	12.7	14.1	15.4	16.7	18.1	19.4	20.7	22.1	24.4	24.7	26.1
⅜″ dia. Hexagon	30.3	33.4	36.5	39.5	42.7	45.7	48.9	51.9	55.	58.1	81.2
⅜″ dia. Square	31.5	34.6	37.7	40.7	43.9	46.9	50.	53.1	56.2	59.3	82.4
½″ dia. Hexagon	56.7	62.3	67.7	73.1	78.8	84.1	89.7	95.3	100.	106.	111.
½″ dia. Square	60.3	65.9	71.3	76.7	82.4	87.7	93.3	99.	104.	110.	115.
⅝″ dia. Hexagon	95.3	104.	112.	121.	129.	138.	146.	155.	164.	172.	183.
⅝″ dia. Square	100.	109.	117.	126.	135.	143.	152.	161.	169.	178.	188.
¾″ dia. Hexagon	141.	154.	166.	178.	191.	203.	215.	228.	240.	252.	265.
¾″ dia. Square	153.	166.	178.	190.	203.	215.	227.	230.	252.	264.	277.
⅞″ dia. Hexagon	211.	227.	240.	257.	278.	291.	307.	324.	340.	358.	379.
⅞″ dia. Square	222.	238.	255.	272.	289.	306.	322.	339.	355.	373.	394.
1″ dia. Hexagon	283.	305.	326.	348.	370.	391.	413.	435.	456.	478.	500.
1″ dia. Square	304.	326.	357.	369.	391.	412.	434.	456.	477.	499.	521.

For over 18 inches long, add for every inch, per gross (or 144 bolts), as under :—

Bolts, inches diam.	⅜	½	⅝	¾	⅞	1
Lbs.	5	8	12	18	24	32

ANGLE AND TEE STEEL.

Weight per foot run.

Size	Thickness.	Weight lbs.	Size	Thickness.	Weight lbs.
¾ x ¾	5/16	0.86	2½ x 2½	5/16	4.98
1 x 1	3/16	1.16	2½ x 2½	3/8	5.90
1 x 1	¼	1.49	2½ x 2½	7/16	6.79
1¼ x 1¼	¼	1.91	2½ x 2½	½	7.65
1¼ x 1¼	5/16	2.32	3 x 3	5/16	6.04
1½ x 1½	¼	2.34	3 x 3	3/8	7.17
1½ x 1½	5/16	2.86	3 x 3	7/16	8.27
1½ x 1½	3/8	3.35	3 x 3	½	9.35
1¾ x 1¾	5/16	3.40	3½ x 3½	5/16	7.11
1¾ x 1¾	3/8	3.98	3½ x 3½	3/8	8.45
2 x 2	¼	3.19	3½ x 3½	7/16	9.76
2 x 2	5/16	3.91	3½ x 3½	½	11.04
2 x 2	3/8	4.62	3½ x 3½	9/16	12.34
2 x 2	7/16	5.30	4 x 4	5/16	8.17
2 x 2	½	5.95	4 x 4	3/8	9.72
2¼ x 2¼	5/16	4.45	4 x 4	7/16	11.25
2¼ x 2¼	3/8	5.27	4 x 4	½	12.75
2¼ x 2¼	7/16	6.04	4 x 4	9/16	14.17
2¼ x 2¼	½	6.80	5 x 5	½	16.18

WEIGHTS OF FLAT BAR STEEL.

In lbs. per Lineal Foot.

Breadth in inches	Thickness in fractions of an inch.								
	4–16	5–16	6–16	7–16	8–16	10–16	12–16	14–16	1 in.
1	.85	1.06	1.28	1.49	1.70	2.13	2.55	2.98	3.40
1⅛	.96	1.20	1.43	1.67	1.91	2.39	2.87	3.35	3.83
1¼	1.06	1.33	1.59	1.86	2.13	2.66	3.19	3.72	4.25
1⅜	1.17	1.46	1.75	2.05	2.34	2.92	3.51	4.09	4.68
1½	1.28	1.59	1.91	2.23	2.55	3.19	3.83	4.46	5.10
1¾	1.49	1.86	2.23	2.60	2.98	3.72	4.46	5.21	5.95
2	1.70	2.13	2.55	2.98	3.40	4.25	5.10	5.95	6.80
2¼	1.91	2.39	2.87	3.35	3.83	4.78	5.74	6.69	7.65
2½	2.13	2.66	3.19	3.72	4.25	5.31	6.38	7.44	8.50
2¾	2.34	2.92	3.51	4.09	4.68	5.84	7.01	8.18	9.35
3	2.55	3.19	3.83	4.46	5.10	6.38	7.65	8.93	10.20
3¼	2.76	3.45	4.14	4.83	5.53	6.91	8.29	9.67	11.05
3½	2.98	3.72	4.46	5.21	5.95	7.44	8.93	10.41	11.90
4	3.40	4.25	5.10	5.95	6.80	8.50	10.20	11.90	13.60
4½	3.83	4.78	5.74	6.69	7.65	9.56	11.48	13.39	15.30
5	4.25	4.31	6.38	7.44	8.50	10.63	12.75	14.88	17.00
6	5.10	6.38	7.65	8.93	10.20	12.75	15.30	17.85	20.40

Wrought Iron Box Girders.
Table for wrought iron girders according to spans.

Spans.	Height of 18 inch walls supported.	Constant load of walls, floors and roofing.	Sectional area of bottom of girder.	Sectional area of top of girder.	Depth of girder.	Thickness of vertical plates.	Angle irons.
10 ft.	10 ft.	13 ton	5 in.	6 in.	9 in.	3-16 in.	2½x2½x¾ in.
do.	15 ,,	18 ,,	6 ,,	7 ,,	do.	do.	
do.	20 ,,	24 ,,	8½,,	10 ,,	do.	do.	
15 ft.	10 ,,	20 ,,	8 ,,	9 ,,	12 in.	¼ in.	2½x2½x7/16 in.
do.	15 ,,	26 ,,	10 ,,	12 ,,	do.	do.	
do.	20 ,,	35 ,,	13½,,	15 ,,	do.	do.	
20 ft.	10 ,,	25 ,,	9½,,	11 ,,	16 in.	5-16 in.	3x3x½ in.
do.	15 ,,	35 ,,	13½,,	15 ,,	do.	do.	
do.	20 ,,	46 ,,	18 ,,	21 ,,	do.	do.	

These beams are calculated to break with about four times the loads, in tons, here mentioned.

Wrought iron plate girders, of the same strength as the box girders, given above, may be made by increasing the area of the top and bottom plates ½ inch, the thickness of the vertical plates for the 10 feet girders ⅜ inch, and the 15 and 20 feet girders, 3-16ths inch.

CIRCULAR IRON SPIRAL STAIRCASE.

5ft. diam., fixed per foot in height from floor to floor ... £5 10 0
4ft. 6in. diam., do. do. do. £5 0 0

The expansion of Cast Iron, 100ft. in length, by an increase of 100 degrees of heat (Fahrenheit) = about ¾ of an inch.

The expansion of Bar Iron = about 9-10ths. of an inch.

Exclusive of Patterns and Fixing, per cwt.

	£ s. d.		£ s. d.
Water or gas pipes with flange or faucet ends, in small quantities, 3in., 4in., and 5in. dia ...	1 4 0	to	1 10 0
Furnace bars, sewer grates, and area gratings ...	1 8 0	to	1 12 0
Furnace doors and frames, complete	1 16 0	to	2 4 0
Cast-iron plates for floors, 3/16in. to 5/16in. ...	1 4 0	to	1 12 0
Roof or Bridge castings, viz., heads, shoes, couplings, &c.	2 0 0	to	2 10 0

Window Guards, from 18 to 30 high, from 10/– to 14/– per foot run.

Shrinkage of Casting in a foot. Pipes, ⅛in. Zinc and lead per foot 5/16in.; Copper, per foot, 3/16in.: Tin, ¼in.

Girders and Beams ⅛in. in 15in.; Brass, ⅛in. in 10in.

CAST IRON

OPEN CASTINGS FROM STOCK PATTERNS.

£ s. d.

Balcony Railing—
Cast iron, 2ft. 9in. high, 14lb. to 16lb., per foot run, from 3/9 to 0 6 6
Wrought top rail, 1/6 per ft.; Stays, 5/–; 3ft. Gates, 30/– each.
Cast iron ornamental brackets, 16in. x 20in., 5/– to 7/6.

Panelling Frieze—
Cast iron frieze, 6in., 1/6; 9in., 2/–; 11in. 2/6; 15in., 3/– per foot run.

BAKER'S OVEN FITTINGS.

Measurements and Weights.

No. 1 Set	Length. ft.	in.	Height. ft.	in.	Weight. cwt.	qrs.	lb.
Peel Plate and Frame, overall ...	5	7	2	9	5	0	15
Oven Door, inside	1	11½	1	3½			
Furnace Door and Frame, outside	1	10	1	7¾	1	2	0
Furnace Door, inside	1	1½	1	0½			
Ash Pit Frame, outside	1	10	2	1			
Ash Pit Door, inside	1	1¾	1	8			
2 Bearing Bars and 12 Furnace Bars	2	6		—	2	0	4
1 Steam Damper, inside measurement, 9in. x 11¾in.					0	0	26
					8	3	17

£ s. d.

No. 1 Set—Complete Set, as above 28 10 0
No. 2 Set—Complete Set, as above, but with the length of the Peel Plate 6in. shorter 25 10 0
Tie Rods and Plates size to order extra.

No. 3 Set	Weight. cwt.	qrs.	lbs.
Oven door, 18½in. wide x 12in. high, and Frame, 24¾in. wide, 15¾in. high	0	2	10
Peel Plate, 46in. at front, tapering to 25in. at back x 18in. deep	0	2	18
8 Furnace—8 Bars, 2ft. long, and 2 Bearers	1	2	10
2 Dampers and Frames, 10in. x 12in., with 4 W. Iron Rods, 18in. long x ⅝in., with nuts	0	1	0
Furnace and Ash Pit Frame overall, 18in. wide x 45in. high	1	0	11
	4	0	21

Furnace Opening, inside, 12in. x 12in. Ash Pit Opening, inside, 12in. x 23½ in. high.

£ s. d.

No. 3 Set, as above, price from 12 5 0
Bakers' Oven Pyrometers, each 5 0 0
akers Doors, 17″, 35/–, 19″, 37/6 ea.

The Weight per Foot Super of Cast or Wrought Iron.

Thickness	Cast Iron.	Wrought Iron.	Thickness.	Cast Iron.	Wrought Iron.
Inch	lbs.	lbs.	Inch	lbs.	lbs.
1–16	2.35	2.52	$\frac{5}{8}$	23.44	25.20
$\frac{1}{8}$	4.09	5.04	$\frac{3}{4}$	28.12	30.24
$\frac{1}{4}$	9.39	10.08	$\frac{7}{8}$	32.81	35.28
$\frac{3}{8}$	14.06	15.12	1	37.50	40.32
$\frac{1}{2}$	18.75	20.16			

Table showing the Approximate Weight that Given Diameter and Thickness of Metal in Hollow cast iron Columns will support.

The following dimensions are calculated for 10 feet columns, but may be safely adopted up to 12 feet long.

Outside diameter of column inches.	Thickness of metal inches.	Weight supported tons	cwts.	Outside diameter of column inches.	Thickness of metal inches.	Weight supported tons	cwts.
3	$\frac{1}{2}$	3	0	8	$\frac{3}{4}$	18	10
	$\frac{3}{4}$	4	10		1	23	15
	1	6	0		$1\frac{1}{4}$	27	10
$3\frac{1}{2}$	$\frac{1}{2}$	3	15	9	$\frac{3}{4}$	22	10
	$\frac{3}{4}$	6	0		1	26	10
	1	7	15		$1\frac{1}{4}$	35	0
4	$\frac{1}{2}$	4	5	10	1	27	10
	$\frac{3}{4}$	7	0		$1\frac{1}{2}$	51	0
	1	9	10	11	1	32	10
$4\frac{1}{2}$	$\frac{1}{2}$	6	0		$1\frac{1}{2}$	55	0
	$\frac{3}{4}$	8	15	12	1	38	0
	1	11	5		$1\frac{1}{2}$	62	10
5	$\frac{1}{2}$	6	10	13	1	47	10
	$\frac{3}{4}$	9	15		$1\frac{1}{2}$	70	0
	1	13	0	14	1	52	10
$5\frac{1}{2}$	$\frac{1}{2}$	7	0		$1\frac{1}{2}$	78	0
	$\frac{3}{4}$	11	5	15	1	56	10
	1	15	10		$1\frac{1}{2}$	85	0
6	$\frac{1}{2}$	8	10	16	1	61	0
	$\frac{3}{4}$	13	0		$1\frac{1}{2}$	90	0
	1	17	10	17	1	65	10
$6\frac{1}{2}$	$\frac{1}{2}$	9	10		$1\frac{1}{2}$	95	0
	$\frac{3}{4}$	14	15	18	1	72	0
	1	20	0		$1\frac{1}{2}$	100	0
7	$\frac{1}{2}$	10	5				
	$\frac{3}{4}$	16	0				
	1	21	10				

WEIGHT OF CAST IRON PIPES—WATER.
NINE FEET LENGTHS—SPIGOT & FAUCET.

Dia.	Cwts.	Qrs.	lbs.	Dia.	Cwt.	Qrs.	lbs.
2½″	0	3	2	14″	9	1	26
3″	1	0	10	15″	9	3	26
4″	1	1	16	16″	10	3	6
5″	2	0	14	18″	14	0	25
6″	2	2	0	20″	16	1	20
7″	3	0	20	22″	17	3	2
8″	3	2	14	24″	22	0	0
9″	4	2	10	27″	24	0	21
10″	5	1	0	30″	27	0	0
12	7	0	0	33″	32	0	0

Jointing Pipes.—Lead and gasket or fine hemp rope and labour, for joints of socket pipes :—

Pipe—Diam. inter.	4	6	9	12	15	18	24	30	36	42	48
Lead, lbs. per joint	6	9	14	21	29	38	48	59	70	82	94
Gasket, Pence ,,	4	6	8	10	12	15	18	21	24	27	30
Labour, pence ,,	10	15	20	26	37	45	60	75	90	105	120

Two rings or coils of gasket are generally used, about 1½in. wide together. Keep the pipes dry and the mouth of the clay ring oiled to prevent the explosive effect of the steam generated by the sudden contact with the melted lead. Clay only can be used for pipes up to 18in. diam., a leather strap or rope will hold the clay for 24in. pipes ; above this size use iron collars or straps in semi-circles screwed together with bolts at bottom and top, these fit closely to the required joint and are lightly covered with clay. The large pipes can be run with one melting of lead, if heated to a blue tinge ; after the joint is run it is caulked.

The cost of laying the pipes up to 9in. diam. would be about 20 per cent. more than for earthenware pipes (*See* Drainer), above this size as follows :—

Labour.—Making joints of 4ft. diam. cast iron water main pipe—Lead, 2½ x ½ = 150lbs. lead.

Preparing single joint, melting lead, &c., two men, one day, 20/–

For a number of joints reckon 8/– to 10/– each.

Labour in carting one mile, lowering and levelling pipes and adjusting for joints :—

Diam. inches	12	15	18	24	30	36	42	48
Cost per lineal foot ...	1/8	2/4	3/–	3/6	4/2	4/8	5/4	6/–

The cost of excavation in hard clay or light shale to a depth of three feet including recesses for jointing, refilling 9in. layers, watering and ramming per lineal foot, will be about 50 per cent. more than last item for lowering, laying, &c.

Ends of Pipes.—The two flanges of a flange pipe, or the faucet end of a socket pipe, are equal in weight to from 8 to 11 in. of the pipe.

WEIGHT OF A LINEAL FOOT OF CAST-IRON PIPES IN LBS.

Bore inches.	Thickness of metal.	Weight. lbs.	Bore inches.	Thickness f metal.	Weight. lbs.	Bore inches.	Thickness of metal.	Weight. lbs.
3	$\frac{3}{8}$	12.4	11	$\frac{1}{2}$	56.4	22	$1\frac{1}{8}$	254.9
	$\frac{1}{2}$	17.1		$\frac{5}{8}$	71.0		$1\frac{1}{4}$	284.8
	$\frac{5}{8}$	22.2		$\frac{3}{4}$	86.4	24	1	245.0
4	$\frac{3}{8}$	16.1		$\frac{7}{8}$	101.8		$1\frac{1}{8}$	276.9
	$\frac{1}{2}$	22.1	12	$\frac{5}{8}$	77.3		$1\frac{1}{4}$	319.3
	$\frac{5}{8}$	28.3		$\frac{3}{4}$	93.7	27	1	276.0
5	$\frac{3}{8}$	19.8		$\frac{7}{8}$	110.4		$1\frac{1}{8}$	311.0
	$\frac{1}{2}$	26.9		1	127.4		$1\frac{1}{4}$	348.0
	$\frac{5}{8}$	34.4	14	$\frac{5}{8}$	89.6		$1\frac{3}{8}$	384.0
6	$\frac{3}{8}$	23.4		$\frac{3}{4}$	108.4	30	1	305.0
	$\frac{1}{2}$	31.9		$\frac{7}{8}$	127.5		$1\frac{1}{8}$	345.0
	$\frac{5}{8}$	40.6		1	147.0		$1\frac{1}{4}$	384.0
	$\frac{3}{4}$	49.7	15	$\frac{3}{4}$	115.7		$1\frac{3}{8}$	424.0
7	$\frac{3}{8}$	27.1		$\frac{7}{8}$	136.1	33	1	335.0
	$\frac{1}{2}$	36.8		1	156.8		$1\frac{1}{8}$	378.0
	$\frac{5}{8}$	46.7		$1\frac{1}{8}$	177.7		$1\frac{1}{4}$	421.0
	$\frac{3}{4}$	56.8	16	$\frac{3}{4}$	123.1		$1\frac{3}{8}$	465.0
8	$\frac{3}{8}$	30.8		$\frac{7}{8}$	144.7	36	$1\frac{1}{8}$	411.0
	$\frac{1}{2}$	41.6		1	166.6		$1\frac{1}{4}$	458.0
	$\frac{5}{8}$	52.8		$1\frac{1}{8}$	188.7		$1\frac{3}{8}$	506.0
	$\frac{3}{4}$	64.3	18	3	137.9		$1\frac{1}{2}$	554.0
9	$\frac{3}{8}$	34.4		$\frac{7}{8}$	161.8	42	$1\frac{1}{8}$	478.0
	$\frac{1}{2}$	46.6		1	186.2		$1\frac{1}{4}$	532.0
	$\frac{5}{8}$	58.9		$1\frac{1}{8}$	210.8		$1\frac{3}{8}$	588.0
	$\frac{3}{4}$	71.7	20	$\frac{7}{8}$	178.9		$1\frac{1}{2}$	644.0
10	$\frac{1}{2}$	51.4		1	205.8	48	$1\frac{1}{8}$	544.0
	$\frac{5}{8}$	65.1		$1\frac{1}{8}$	232.9		$1\frac{1}{4}$	605.0
	$\frac{3}{4}$	79.0		$1\frac{1}{4}$	260.3		$1\frac{3}{8}$	669.0
	$\frac{7}{8}$	93.3	22	1	225.4		$1\frac{1}{2}$	733.0

Weight of Metals.—To find the weight in lbs. multiply the cubical inches of zinc by 25, cast iron, tin or white metal by 26, wrought iron or steel by 28, brass by 30, copper or gun metal by 31, lead by 41 ; cut off two figures to the right, the remainder will be lbs.

RECIPE PIPE JOINT.

Cement for Iron Pipe Joints.

Ten pounds of ground litharge, best quality, four pounds of best Paris whiting, one-half a pound of yellow ochre, two pounds of dry red lead, one-half an ounce of hemp cut into half-inch lengths ; mix well with boiled linseed oil to the consistency of thick putty ; make joints in usual way. The above mixture will set quick when heat is applied. It repairs boilers, resists fire, and will set in water.

TABLE OF THE WEIGHT OF A SUPERFICIAL FOOT OF VARIOUS METALS IN LBS.

	Thickness by the Birmingham Wire Gauge.											
	1	2	3	4	5	6	7	8	9	10	11	12
Iron	12.00	11.36	10.36	9.52	8.80	8.12	7.20	6.60	5.92	5.36	4.80	4.36
Copper	13.74	13.00	11.86	10.90	10.07	9.29	8.24	7.55	6.77	6.13	5.49	4.99
Brass	13.17	12.46	11.37	10.45	9.66	8.91	7.90	7.25	6.50	5.88	5.67	4.78

	13	14	15	16	17	18	20	22	24	26	28	30
Iron	3.80	3.32	2.88	2.60	2.32	1.96	1.40	1.12	.88	.72	.56	.48
Copper	4.35	3.80	3.29	2.97	2.65	2.24	1.60	1.28	1.00	.82	.64	.55
Brass	4.17	3.64	3.16	2.85	2.54	2.15	1.53	1.23	.96	.79	.61	.53

	Thickness in Parts of an inch.												
	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1
Iron	2.5	5.0	7.5	10.0	12.5	15.0	17.5	20.0	25.0	30.0	35.0	40.0
Copper	2.9	5.8	8.7	11.6	14.5	17.4	20.3	23.2	28.9	34.7	40.4	46.2
Brass	2.7	5.5	8.2	10.9	13.6	16.3	19.0	21.8	27.1	32.5	37.9	43.3
Lead	3.7	7.4	11.1	14.8	18.5	22.2	25.9	29.6	37.0	44.4	51.9	59.2

STEEL SASHES.

Cast steel casement and frame made to certain sizes, ready to receive glass in one pane, with square head and hinged to open outwards, with fastenings complete, according to the design, at per foot super., 6/– to 9/–.

Fixed steel sash frames 5ft. x 6ft., 9 light per foot super—5/–. Ditto, 3 light, curved, add 50 per cent., viz., 7/6.

STEEL CASEMENTS AND SASHES.

The " Fenestra " Intersection Joint.

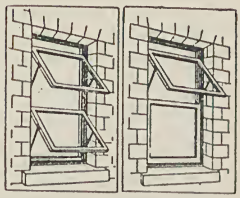
A small cross slot is made in the vertical bar and shaped to receive the flange and moulding of the horizontal bar to pass through ; the moulded portion is then pressed out so as to fold closely round the mould of the horizontal bar. It has a small notch made to act as a lock. The amount of metal removed in making a " Fenestra " joint is in its favour compared to the usual mitred joint.

Rolled Mild Steel Sashes and Frames, 1 x ½in. upwards, casement or pivot hung, with or without frames, per sup ft., unfixed, from 7/–.

ROLLED STEEL REVERSIBLE CASEMENTS.

from 10/– per super foot unfixed.

The above steel sashes are sometimes built in during erection of building with ties at side and lead plugged, or lead joints made.



STEEL WINDOW FRAMES.

from 7/– per super foot.

Austral Steel Roller Shutters provide strength and security, yet occupy far less space than any other type of door. These shutters are to be found in many of Australia's leading buildings. Constructed of interlocking steel slats 2″ x 21G. Steel, reinforced with a heavy steel bottom rail. A steel tube roller revolves on a stout axle and is encased with heavy spiral springs of ample proportion to evenly balance the weight of the shutter.

Austral Wood Roller Shutters provide the efficient entrance covering for Garages, Service Stations, and factories, etc. Constructed of thoroughly seasoned Redwood slats morticed at approx. 14″ centres, through which lining of Copper, Hemp Webbing, and Steel passes vertically.

Austral Fire Resisting Doors either hinged or Sliding complete with Automatic closing attachments are manufactured to comply in all respects with the requirements of the Fire Underwriters Assn. of Australia.

Prices are on application as the size and type of job differs somewhat in almost every instance.

See makers Advt., p. 21.

Cutting Rolled Steel Girders through with Oxygen.

The Knowles Oxygen Co. of Birmingham gives the cost of cutting through 15in. x 15in. R.S. girders at 42 different places :—

	£	s.	d.
Oxygen used, 200 c. ft., at £2 per 1000 c. ft.	0	8	0
Hydrogen used, 300 c. ft., at £1 per 1000 c. ft.	0	6	0
Labour and Time Specialist working machine, 5 hours at 4/–	1	0	0
Net cost	£1	14	0

About 9d. per cut.

GIRDERS.

Compound Girders, up to 2ft. deep, for general building purposes, are usually made by one or more steel joists riveted to plates top and bottom, which give additional strength to the joists in compression and tension strains according to thickness of plates.

Thus, two joists, 18in. x 7in. at 20ft. span (see combined safe load as per table steel joists, 32 tons each) = 64 tons.

But with two plates, 16in. x $\frac{5}{8}$in. riveted to top and bottom flanges, the combined safe load should be 82½ tons, increasing the strength 25 per cent. or more.

Compound Girders, with top plate riveted on every 12 inches, Approx. 33/– per cwt.

Ditto, top and bottom plates riveted on, 27/6 per cwt.

Hoisting and setting, reckon 3/– to 4/6 per cwt. per floor.

STEEL GIRDER BRIDGES.

Labor only. Per cwt. including scaffolding.
(Approximate).

	£	s.	d.
Fitting and riveting large lattice girders, previously put together, over land bays and spans	0	10	6
Ditto, ditto, over water, rivers, &c.	0	12	6
Riveting only, per 100 rivets, from 15/– to	1	10	0
Ditto, ditto, with machine, from 4/– to	0	9	6
Making, punching, riveting, constructing, fitting, and fixing large plate girders for bridges, &c.	1	17	6
Ditto, lattice or triangular girders, or large tanks ...	2	10	0
Ditto, small box or plate girders for floors, shop windows, &c., small tanks, caulked	2	15	0

Steel Girder Bridges, general average price per ton, £21.

AWNINGS.

City Specification.

Awnings to be constructed of approved designs, in steel scantlings, T and angle iron well primed in red lead.

Rivets to be ½in. dia., countersunk where necessary.

Rafters to be spaced at not more than 8ft. centre to centre.

Trusses to be constructed as shown and fixed at ends of awning and where practicable.

Suspension Bars, 1in. x 1in., to have screw coupling, and spaced as required.

Roof covered with 24G. Gal. Cor. Iron secured with galv. iron clips, lead washers and nuts, junctions with adjoining roofs to be made water-tight by overlapping 6in.

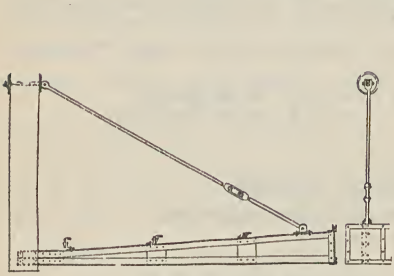
Flashing to be in 5lb. lead let into joint 1½ and pointed in cement.

Gutter 22G. Gal. Iron, riveted and sweated at joints, discharging into 4in x 3in. cast iron down pipes let flush into walls and carried under footpath into street gutter.

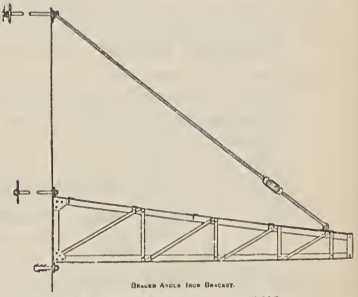
Return ends of awning to be similar to Fascia, any space caused by variation in height of awnings, is to be filled in approved manner, and curved around at street corners.

Awnings to be fixed to the satisfaction of Inspector. Awnings to have ceiling of approved materials on strong firring, and finished to a horizontal surface.

SUSPENDED STREET AWNINGS.



City Council's No. 1 Design Suspended Awning.



Braced Angle Iron Bracket.

BRACED SUSPENDED AWNING.

T AND L IRON AT 25/- PER CWT.

12 FEET WIDE, PER FOOT RUN.

Type Design.	heavy	light
No. 1.—Suspended steel awning, wall gutter, net	...32/-	27/-
No. 1.—Suspended steel awning, fascia gutter, with R.S.J. cantilever; built in 6ft.		
Special Prices for Conditions of Building.		
No. 2.—Suspended steel awning, **fascia gutter** ...	...29/6	23/-
No. 3.—Suspended steel awning, **fascia gutter, light type**	27/-	22/-

N.B.—**Underside** of awning fascia to be 11ft. from kerb to footpath —mean level and to width of footpath.

Allow for hold back stays to one storied shops.

DIVER AND CYLINDER.

Diving Apparatus complete in the Australian cities from £175 to £250.

Two men can work the air pump to a depth of 51 feet.

In a diving bell men can work for several hours at this depth under a pressure of 37½ lbs. per square inch. At a depth of 90 feet they can work only for about an hour without seriously suffering from paralysis.

Iron Cylinders, for bridges, wharves, &c., are sunk by Triger's *plenum process,* which consists in forcing air into the cylinder to such an extent as to force out the water below the bottom of the cylinder. leaving the earth or soil nearly dry; the men pass in and out of the

cylinder by an *air lock*, which is generally of the same diameter as the cylinder, and about 6ft. high ; it is secured to the top of the cylinder, and is fitted with air-tight valves at top and bottom, through which the men pass. These men are entirely at the mercy of those employing them, and may be injured for life by paralysis, caused by working too long, or at too great a depth. The laws relating to the supply of air, &c., are similar in their results to those relating to the diving dress and diving bell. The iron cylinders of the Darling Harbour Wharf, Sydney, and the Parramatta River iron girder bridge, near Sydney, were sunk by the *plenum process*. See " Trautwine's Engineer's Pocket Book." See Metal Worker.

LIFTS

(*See Advertisement Page* 10).

Lift Installations are almost invariably entrusted to specialists. Extensive and up-to-date experience with the requirements of Government and other Authorities is essential. The information given here is intended only as a guide to builders who may be consulted about lifts or who may wish to know approximately what provision should be made for them in buildings ; but it is advisable to check it up with specialists before any definite action is taken.

The **lift contractor supplies and fixes** the machinery and its controlling apparatus, the car frame and safety gear, the balance weight, guides and backings for car and balance weight, the ropes, door locks, buffers, limit-switches and other devices appertaining specially to lifts. He usually provides and fixes also the rolled steel joists that support the machinery, the car floor and car super-structure, and the door hangers and tracks. Unless the builder has the special experience necessary to make the **doors** it is better for the lift contractor to deal also with these, and in Automatic lifts it is almost essential. Although the **enclosures** to the liftwell are generally formed by the builder, they are part of the lift as far as the Government Lift Inspector is concerned, and care should be taken that drawings of them have been submitted and approved before they are put in hand. The builder trims the well, forms the water-proof pit, builds the motor-room and provides the access to pit and motor-room required by Regulations.

Regulations become stricter every year. It is important that **liftwells** should be built accurately to the dimensions of the " layout " finally decided upon. Any inward projections may result in the car fouling the well ; and special care should be applied by the builder in locating the well trimmers.

Electric Power is usually brought to the lift motor-room by the contractor for the general electrical installation, and as it will be needed there some weeks before the lift is required for service, this should be specifically provided for in his contract, which should also include a connection from the hall lighting circuit to a point about halfway down the liftwell whence the lift contractor should connect to the car lights.

There should be a clear understanding in advance with the lift contractor about the use of **cranes** for placing machinery in position, and about the **date** when liftwell and motor-room are to be finished and handed over for his exclusive use (generally four to twelve weeks before the lift is required for service). Arrangements to use the lift as a **builder's hoist** are seldom satisfactory, as the lift contractor and builder both need it most at about the same time. Moreover, lift cars are often damaged by conveying building materials, and there have been a regrettable number of fatal accidents to builders' employees arising out of this use of lifts during progress. Other accidents prove that **liftwells should not be used** for running pipes or for similar purposes.

The fact that every lift is required to be regularly inspected and maintained throughout its life makes it advisable to deal only with well-established lift concerns. It is possible to make a lift out of cheap ordinary motors, switches, and other parts not intended for lifts; but such a combination is liable to prove unsatisfactory. The fact that it is " passed " by a Government Inspector is no guarantee of reliability.

The **prices** stated in what follows are only rough approximations based on costs that have been ruling in Australian Capital Cities for reliable but economical construction. At the time of going to press, prices are rising on account of wage increases in the engineering trades.

Unless otherwise indicated, the figures include supply and installation of the lift machinery and control apparatus, counter-weight, car, car superstructure (except for passenger lifts), runners, safety gear, buffers, door locks, and bells (if required). They do not include the joists for supporting the machinery.

Costs rise sharply at certain small changes in running speeds. For example : a lift running at 200 feet per minute, may use round steel runners on wooden backings, with gripper-type safety gear ; while one at 210 feet per minute requires planed tee-section steel runners and Wedge-Clamp safety gear.

Although the **electric lift** is now supreme for most situations, the **hydraulic** is by no means obsolete. For comparatively short travel, and where water at 60 lbs. pressure or upwards is freely available, it is still a system to be considered ; but the Water Authorities will seldom allow connection to public mains. In a factory, or anywhere with running lineshafts handy, **belt driven** lifts are the cheapest of all in first cost.

CLASSES OF LIFTS.

Handpower Lifts. These may be made to handle practically any load, but handpower for heavy loads necessitates such slow speeds that their use in Australia is confined almost exclusively to service lifts. They are also commonly used abroad for transporting **invalids** in private houses and hospitals.

The machinery is usually placed over the top of the well; an endless rope is looped down either outside or inside the well, and the operator shifts the loads by pulling on this rope. Gearing is included whereby a moderate pull suffices to move the car at a speed that varies inversely with the load. A brake is provided so that the load may be stopped whenever desired.

A Handpower Service Lift travelling about 12′ from one floor to another, and carrying up to 100 lbs. with a car 2′ cube, costs about £70 installed; an invalid lift with car 3′ 6″ sq., travelling 12′, costs about £150 installed. The well required to be about 6″ larger than the car all round.

Lift Specialists are usually willing to advise whether a handpower lift is practicable for any other special conditions. The nett load to be carried, travel, car dimensions desired, space available for a pit and above the top landing (see Page 276) should be stated in enquiries, also some idea who is to work the lift (average man, boy, girl, etc.).

Belt-driven lifts are seldom applied except for goods lifts travelling up to four or five floors and carrying up to one ton at speeds up to 50 feet per minute. They are handrope controlled. For dimensions see Page 276, except that no motor-room is required, the machinery being usually attached to a ceiling adjacent to the well or wherever line shafting is handy. A belt-driven lift to carry 1 ton through a height of 50′ costs about £600. For doors see later notes on goods lifts.

Electric Service Lifts or "Dumbwaiters." These can be made suitable for any public electricity supply, or private supply of 10 kilowatt capacity or over.

Regulations limit the cars to not more than 9 sq. ft. in floor area by 4′ high, but it is wise to keep to the minimum that will hold the largest articles normally carried, because experience shows that people will fill the cage full, even if this means an overload which may damage the apparatus. A sensible size car for service to the different floors of residential flat building or for hotels, is 2′ 0″ x 2′ 0″ x 2′ 6″ high, rated to carry a load of 100 lbs. This will require a lift well approximately 2′ 10″ wide by 2′ 6″ deep.

Such lifts may be controlled automatically by push buttons from one landing only, or by "Call and Send" control whereby they may be sent or called from any landing to any other landing; and

on arrival at the desired landing they stop automatically. In residential flats it is best to arrange control entirely from the landing to which the tradesmen have access, with some form of speaking tube or telephone to each flat. The cost of such a lift serving two floors is about £230 upwards, and each additional floor costs about £12. This does not include speaking tubes or telephones or doors. Doors are usually of the vertical sliding type, costing £9 each with their weight boxes.

In the simplest " layout " the car is open on one side only, so that goods are taken out the same way as they go in. Cars may be arranged so that goods are taken off at the sides of upper floors or may be " through " type with entrances front and back.

Electric Goods Lifts : Vary from Service Lift duties up to any load and speed (the load and speed of a lift are generally referred to as its " **duty** "). A minimum size car for a warehouse lift is about 5′ 0″ x 5′ 0″ (see Page 276 for other dimensions), to lift a load of 15 cwt. The ordinary warehouse lift usually carries a ton at 125′ to 200′ per minute. The former duty, serving four floors, with control by car switch will cost about £1,000, and each additional floor £40. The lift should be made two-speed for over 150′ per minute (about £80 extra) ; and if it is essential that it should stop automatically dead level with the landings, it should be provided with automatic floor-levelling (about £120 extra).

Car switch control is usual, as a goods lift does not need a certificated driver. The advantages of automatic control for this service are small unless the lift is very seldom used, or unless for some other reason it is uneconomical to employ a driver. Automatic control adds about £80 plus £20 per floor to the cost.

There should preferably be only one entrance to goods lift cars. Regulations require that the cars of all automatic lifts (goods or passenger) shall be fitted with gates of some kind at each car entrance, and no really satisfactory gate for a goods car has yet been produced, although the round-the-corner type recently introduced offers possibilities. A goods lift should be at the side of a cart dock rather than at the end ; and there should be a platform between the cart dock and the lift.

A most popular goods lift door has been the vertical rising type, often made double where there is insufficient room between the landings for single ; but the vertical bi-parting or " Peelle " type is coming into favour, particularly where fire-resisting construction is required. The average single ordinary type door costs £20 ; double £24 ; a pair of bi-parting tin-clad fire doors £70.

There are **Garage Lifts** working in Australia to carry loads up to 6 tons, with cars 35′ long x 9′ wide.

Electric Passenger Lifts. Each passenger is reckoned at 150 lbs. weight and to occupy 2 square feet of car floor area. See Page 276

for dimensions. Speed is seldom lower than 120 feet per minute, and the highest speed in Australia practice is 600 feet per minute, although it is doubtful if there is much to be gained by exceeding 450. High-speed lifts are usually of the " gearless " type with " variable-voltage " control and their features can hardly be dealt with in these brief notes.

The duties of ordinary " geared " lifts range from 900 pounds at 125 ft. per minute to 3000 pounds at 350. A lift travelling at more than 150 ft. per minute should have two-speed control. If the driver is expected to stop the lift for people he sees approaching along corridors the speed should not exceed 250-300 ft. per minute. Regulations usually demand that a passenger lift must be operated by a **certificated driver,** unless it is provided with automatic control. A driver will be found essential to regulate the traffic in busy lifts.

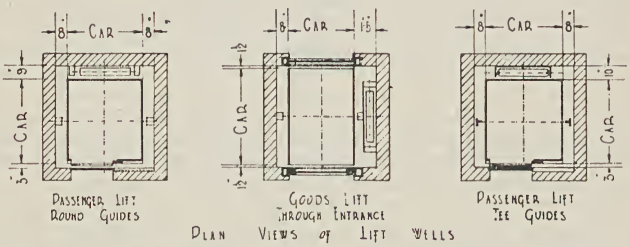
Passenger lifts may vary in cost from £500 to £5,000. A 5-floor lift for residential flat purposes, to carry 6 people at 120 ft. per minute with a car in the well 3′ 2″ x 4′ 2″ with automatic control costs about £1,000. One for 8 people at 200 ft. per minute for 8 floors costs about £1,450.

A car-switch lift for a 10-floor office building to carry 17 passengers at 300 ft. per minute costs £1,650. " Dual " control (car switch for day and automatic for night) adds £150. Automatic door closers (advisable for automatic control) add £15 per door. Horizontally-sliding doors of polished wood with wirework vision panels, with runners and tracks, £20 each. Hinged doors are sometimes used in private houses. Landing indicators to show the position of the lift, £15 per landing.

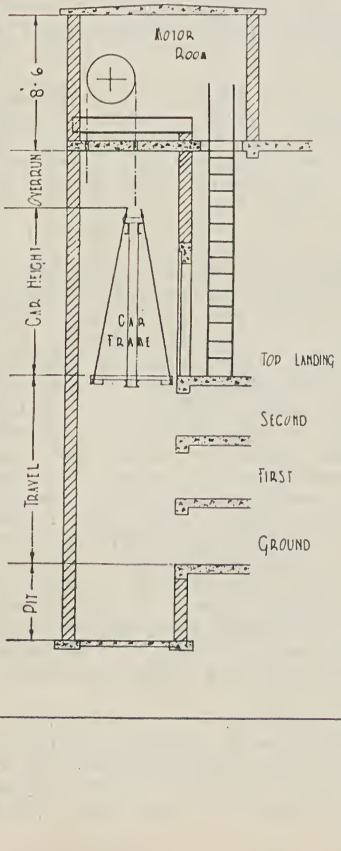
Car Superstructures for passenger lifts vary in cost from £50 to £200. There is a tendency for polished wood to return to favour in certain classes of work, as it is cheaper than metal, has a cheerful appearance, and can be touched up if accidentally damaged. There should preferably be only one entrance in a car. Regulations require **car gates** on all entrances of all automatically-controlled lifts, and in some other circumstances ; they also discourage the use of glass.

Noiseless operation has become a very important consideration now that buildings are frequently made of concrete and electric supply systems are on the alternating-current system. It is practically impossible to prevent the transmission of noise in a one-piece concrete structure, and care must be taken in such cases to select equipment that gives rise to as little noise as possible. A double-ceiling to the liftwell, a wooden floor, and celotex-lined walls in the motor room help to keep noise out of the structure. Brick motor rooms are preferable to concrete for this reason. In some concrete buildings the liftwell has actually been built as a brick tower within the building, and insulated from it at the landing by cork packing. Automatic door-closers that embody checking buffers are valuable to prevent noise from slamming lift doors.

Enclosures. Except when in stairways, or in exterior positions where nobody has access, liftwells must be totally enclosed. In a stairway, enclosures must extend 6′ 6″ at right-angles from the stair nosing (7′ 6″ at the balance weight). Enclosure work comprising stout mesh wire on wooden framing costs 6/– per square foot, upwards.



PLAN VIEWS OF LIFT WELLS



These diagrams give a general idea of space required for electric goods and passenger lifts; however, to meet special situations lift contractors can reduce them somewhat. The actual "**lay-out**" **drawing** agreed on with the lift contractor should be strictly followed if it is available. The width and length of the motor room will be determined by the class of machinery to be installed, but for the smaller sizes of passenger and goods lifts about 10′ x 9′ will suffice. The dimensions required for car height, overrun, and pit, are as follows:—

Speed. (ft. per min.)	Car. Height		Overrun.	Pit.
	Pass.	Goods.		
up to 200	9′ 6″	8′ 0″	3′ 0″	4′ 6″
300	9′ 6″	8′ 0″	4′ 0″	6′ 0″
400	9′ 6″	8′ 0″	5′ 0″	10′ 0″

Bi-Parting Fire Doors for goods lifts require two to six inches more space at each side than is shown. If water is likely to enter the pit a sump and automatic pump should be allowed for. Although ladder access is shown to the motor room, a stair is preferable and may in some instances be required by Regulations. This access should be from a room or passage that is unlikely to be locked up by a tenant of part of the building, and the same applies to the main switchboard in the basement. Provision must be made for a locked motor-room door, and the use of the motor-room for any other purpose than lift machinery is sometimes prohibited. Ventilation should be well provided for.

METAL WORK

STAINLESS STEEL IN THE BUILDING INDUSTRY.

Metals used by builders for centuries have proved that certain materials are unsatisfactory, others partly so ; the modern builder builds for permanence combined with beauty and when metal is used for exterior work where corrosion has to be resisted it is important that the beauty is not skin deep.

Therefore, it is no wonder that when selecting metals for this type of work architects and builders throughout the world have chosen stainless steel, the most permanent of all metals, capable of giving the most modern effects when combined with other materials.

Stainless steel retains its qualities for indefinite periods and this is an important point as a quick survey of all the other metals which have been used, such as copper, brass, steel, etc., reveals that they require constant attention as they soon tarnish and lose their original lustre. Stainless steels are not affected in this manner, and have merely to be washed with soap and water to retain their wonderful finish.

Furthermore, stainless steels are structurally sound and have high tensile figures ; in comparison with ordinary steels almost 1½ times. They have greater toughness combined with the fact that they can be manipulated into all forms and shapes which is not possible with many metals.

In modern building practice in many instances the builder not only undertakes the exterior work, but often in the case of hospitals and Government buildings is responsible for interior fittings such as sinks, drainers, cupboards, etc., in kitchens and once again stainless steel takes the foremost place in the field of materials for applications of this nature.

Like all other metals, stainless steel has its peculiarities of fabrication, and to obtain the best results special knowledge must be employed. Malleys Limited, who have specialised in the manufacture of Stainless steel for the building industry, can supply all manner of articles which the builder may require. To obtain the best results from the use of this beautiful metal there must be 100% co-operation between both parties, i.e., builder and manufacturer.

This is, and will continue to be, an age of stainless steel as few people realise that corrosion of steels and metals costs the world approximately £196,000,000 per annum. Stainless steels are important to all sections of the community especially to the builder whose reputation is bound up in the buildings he erects.

Malleys Ltd., over the last few years, have designed, manufactured and installed many thousands of pounds worth of highly finished stainless steel goods such as sinks, draining, boards and all classes of kitchen equipment, bein maries, urns, etc., refrigeration cabinets, both commercial and domestic, and many types of decorative scrolls,

letters, doors and awnings for various builders, Government Departments, Hospitals and Institutions. A few of their most recent installations are :—

Great Northern Hotel, Newcastle.
Mayfair Hotel, King's Cross.
Pacific Private Hospital, Brighton-le-Sands.
Maitland Hospital, West Maitland.
Penneys Ltd., Brisbane.
Rural Bank of N.S.W., Sydney.

Malleys Ltd., place at the disposal of their clients their free Architectural Service Department, which offers in one efficient organization the services of expert designers, engineers and metal working craftsmen, supported by unequalled facilities for the manufacture of sheet metal products of every description.

Further details and particulars on application (*see advt., p.* 22).

A NEW DEPARTURE IN STAINLESS STEEL.

For many years, the problem of manufacturing a very fine gauge stainless steel for decorative purposes has exercised the minds of metallurgists and industrialists alike.

Continual experiment and research along these lines has now successfully solved this problem and the Ludlum Steel Co. of America are the fortunate world patent holders of a new product marketed as **Ludlite Silichrome Stainless Steel.**

WHAT LUDLITE IS.

Ludlite is a composite material. Its outer surface is a thin sheet of strong, light, stainless steel. Its inner surface is a tough, waterproof, flexible backing of impregnated rag-felt material. By a special manufacturing process the stainless steel and the flexible backing are permanently combined under heat and pressure.

The backing material affords desirable support to the steel and makes it possible to apply Ludlite to plaster, wood, concrete, fibroboard, and other surfaces, the backing also has special heat, sound, and electrical insulating properties.

Ludlite is supplied in rolls two feet wide and fifty feet long. Two gauges are manufactured, one being 0.008 in. thick for purely decorative applications and one being 0.015 in. thick for applications which must withstand considerable abuse in service.

Two analyses also are made, one being the straight 17-chromium type for decorative purposes, the other being the 18 chromium-8 nickel type for withstanding particularly severe corrosive conditions.

EASY TO USE.

The outstanding feature of Ludlite is the remarkable ease with which it can be installed. It can be cut right on the job with ordinary heavy scissors and shaped and cemented in place with a cement specially manufactured for the purpose. Hence it is a simple matter for a handy man to use the material anywhere.

COMMERCIAL AND DOMESTIC USES.

Ludlite is transforming the home. Stainless steel shelf coverings in pantries and kitchens are replacing oil cloth and linoleum. Drain

boards and back panels are blossoming out with home-applied Ludlite. Bathrooms are shining in Ludlite tile. Bins and boxes are being lined with Stainless Steel. Door push plates, fireplace screens, small table tops, trays and wainscotings are assuming a lustre that will last indefinitely. For Ludlite is Stainless Steel with all the resistance to rust, acid, tarnish and wear that have made stainless steel the greatest metallurgical development of the century.

The same advantages that make Ludlite such an ideal material for home use also adapt it to countless practical and decorative uses in stores, cafes, hospitals and workshops. Already it is being applied to shop fronts, counters, bars, tables, storage bins, shelves, operating theatres and for many purposes where sanitary and hygienic conditions are required. Commercial possibilities for the use of Ludlite are almost limitless. Sole Australasian distributors for Ludlite are Malleys Ltd., Sydney.

Se advt., p. 22.

ALUMINIUM.

(*Extracts from Richards on Aluminium.*)

Aluminium is the lightest of commercial metals, ⅓ as heavy as iron, hard as copper, very ductile and easy to cast in iron or sand moulds, and hardens more when being worked.

Being non-magnetic and non-tarnishing, it can be used for electrical work where a magnetic metal would be useless, but the electrical conductiveness is 34 per cent. less than copper, and requires less annealing than copper. With the exception of lead, it unites readily with all the common metals.

Hydrochloric acid is its natural solvent.

For light structural purposes it is invaluable.

Pittsburgh Reduction Company, Niagara Falls, have the largest works and output.

ALUMINIUM.

Weight of per square foot in lbs. and decimals.

Gauge.	Weight per square foot	In Sheets 24in. x 96in.
12	1.406lbs.	11¼lbs.
16	.906 ,,	7¼ ,,
18	.687 ,,	5½ ,,
20	.25 ,,	4 ,,

A cubic foot of Aluminium weighs 166lbs.

Price of Aluminium. Subject to fluctuations.

Ingots, per lb., 5/–; Sheets, per lb., 5/6; Round Bars, per lb., 7/6; Flat Bars, per lb., 8/–; Wire, per lb., 6/6.

COPPER AND ITS ALLOY.

Metal Manufactured.	Copper.	Zinc.	Nickel.	Tin.	
German Silver	60%	20%	20%	—	100 pts.
White Metal	56%	5%	39%	—	100 pts.
Gun Metal	90%	—	—	10%	100 pts.
Bell Metal	80%	—	—	20%	100 pts.
Rolled Brass	60%	40%	—	—	100 pts.
Flexible Bronze	95%	—	—	5%	100 pts.

MELTING POINTS OF METALS.

(*Prof. Roberts-Austen.*)

	Deg. Fahr.		Deg. Fahr.
Aluminium (pure) ...	1,289	Mercury	—39
Antimony	810	Nickel	2,810
Bismuth	510	Platinum	3,080
Brass	1,650	Steel (hard)	2,570
Silver	1,733	Steel (mild)	2,687
Gold	1,913	Tin	446
Iron (cast) ...	1,920 to 2,012	Zinc	779
Iron (wrought) ...	2,912	Copper	1,929
Lead	612		

SHRINKAGE OF CASTINGS.

(*From Pattern Maker's Rule.*)

Aluminium, Brass, Copper, Zinc	$\frac{5}{16}$in.	Tin	1/12in.
Cast Iron, and Lead ...	$\frac{1}{8}$in.	Steel	$\frac{1}{4}$in.

HINTS ON WORKING OF ALUMINIUM.

Rivets to be used cold of the same composition as sheets in slack holes for joining sheets.

Hard soldering clean surfaces to remove the oxide and while solder is molten.

Flux, alkaline halide, same as used for welding Aluminium. The oxide is removed by means of a silicon alloy 10/13% with an alloy of aluminium. Melting point, 500° Cen.

Cut mitres or joins at angles with a fine hack-saw file smooth, or a tenon saw and jack-plane.

For **screw-joints** to **small** tubes, red or white lead should **not** be used but substitute a bituminous paint.

Flanged joints for larger pipes (screwed or welded), use asbestos gaskets.

Drill holes with a flat drill or Morse twist bit. Beeswax and tallow lubricant.

Sheet annealing is most effective at 250° to 300° Cen.

Avoid overheating to prevent buckling of sheet.

WEIGHT OF ALUMINIUM.

Aluminium Products are so varied and light in weight.

Thus a nosing and tread for stair $2\frac{1}{4}'' \times \frac{1}{4}''$ thick = .37 lbs. per foot.

A channel $2'' \times 2'' \times \frac{1}{4}''$ thick = 1.64 lbs., a $\frac{1}{2}'' \times \frac{1}{2}'' \times \frac{3}{32}''$ = .150.

Angles $1\frac{1}{2}'' \times \frac{1}{8}''$ thick = .42, $1'' \times 1'' \times \frac{3}{32}''$ = .21. $\frac{3}{4}'' \times \frac{1}{4}'' \times \frac{1}{8}''$ = .125.

Prices Sheet 20 s.w.g. and thicker = ... 2/– per lb.
25 s.w.g. to 30 s.w.g. = ... 2/6 per lb.
Aluminium matting, fluted, 18 s.w.g. = 2/– per sq. ft.
Pyramid hollow back ... ... 1/4 per sq. ft.

Monel Metal is a silvery, rustless, strong, semi-rigid metal Alloy. can easily be soldered, brazed, welded or forged. Pressed from the sheet or drawn on to wood mouldings. Black Carrara Glass unites in harmony with this Monel metal.

MUNTZ METAL SHEETS.
Weight per super foot.

60% Copper. 40% zinc.

Used for covering timber piles roof covering, guttering and down-pipes, tanks, &c.

Naval, 26 gauge, 6′ x 3′ sheet price, from 1/6 per s. ft.

S.W.G.	Weight per ft. s.	S.W.G.	Weight per ft. s.
32	8oz.	19	2lbs.
30	9oz.	18	2¼lbs.
28	10oz.	17	2½lbs.
27	12oz.	16	3lbs.
26	13oz.	15	3½lbs.
25	14oz.	14	3¾lbs.
24	16oz.	13	4¼lbs.
23	18oz.	12	5lbs.
22	1¼lbs.	11	5½lbs.
21	1½lbs.	10	6lbs.
20	1¾lbs.	9	6½lbs.

One quarter of an inch thick and over is termed **Plate.**

Naval Brass an alloy of 62% copper, 10% tin and 37% zinc, similar to **Muntz** or **Yellow Metal.**

SOLDERS.

(*From Metal Trade Referee.*)

For **lead** ...	1 part tin, 2 parts lead.
For **brass**	2 parts brass, 1 part zinc.
Hard solder	2 parts copper, 1 part zinc.
Soft solder	2 parts tin, 1 part lead.

FLUXES FOR SOLDERING.

Tinned iron	Resin or spirits of salts.
Copper and **brass**	Sal ammonia or spirits of salts.
Zinc	Spirits of salts, **Lead,** Resin.

SHEET COPPER.
Subject to Market Fluctuations. Prices of application.

8	ounce	equals	approx. 32G.	1	pound	equals	approx. 24G.
9	,,	,,	,, 30G.	1¼	,,	,,	,, 22G.
10	,,	,,	,, 28G.	1½	,,	,,	,, 21G.
12	,,	,,	,, 27G.	1¾	,,	,,	,, 20G.
13	,,	,,	,, 26G.	2	,,	,,	,, 19G.
14	,,	,,	,, 25G.	2¼	,,	,,	,, 18G.

COPPER RODS AND BARS.
Weight per lineal foot in pounds.

Side or Diameter in inches.	⅛	¼	5/16	⅜	½	⅝	¾	1	1¼	1½
Square	.06	.24	.37	.54	.96	1.5	2.1	3.8	6.0	8.6
Round	.05	.19	.29	.42	.75	1.2	1.7	3.0	4.7	6.8

RELATIVE WEIGHT OF WOODEN PATTERNS AND METAL CASTINGS.

One pound Weight of Pattern in	Corresponding Weight of Casting in pounds.				
	Cast Iron.	Zinc.	Copper.	Yellow Brass.	Gun Metal.
Mahogany	8	8	10	9.8	10
White Pine	14	14.5	18	17.5	17.8
Yellow Pine ...	13	12.6	16	15.5	16
Cedar	11.5	11.4	14.5	14	14.5
Maple	10	9.8	12.5	12	12.4

SHEET ZINC.

Perforated (7ft. x 3ft. Sheets).

8 hole x 7 gauge, 5/3 per sheet, or 3d. per sq. ft.
$\frac{3}{16}$ to $\frac{7}{8}$ hole x 12 gauge, 9/6 per sheet, or 5½d. per sq. ft.

ZINC SHEETS.

Gauge No.	Approximate weight per sq. ft.	Thousandths of an inch	7′ x 2′ 8″		7′ x 3′		8′ x 3′		Nearest Wire Gauge
			Approximate		Approximate		Approximate		
			Weight per sht.	No. of shts in 10 cwt.	Weight per sht.	No. of shts in 10 cwt.	Weight per sht.	No. of shts in 10 cwt.	
	oz.		lb. oz.		lb. oz.		lb. oz.		
4	4¾	.008	—	—	6 4	180	—	—	34
5	5¾	.010	—	—	7 9	148	—	—	31
6	6¾	.011	7 14	142	8 14	126	10 2	111	30
7	7¾	.013	9 1	124	10 3	110	11 10	96	29
8	9	.015	10 8	107	11 13	95	13 8	83	28
9	10	.017	11 11	96	13 2	85	15 0	75	27
10	11½	.019	13 7	83	15 2	74	17 4	65	25
11	13	.021	15 3	74	17 1	66	19 8	57	24
12	15	.025	17 8	64	19 11	57	22 8	50	23
13	17	.028	—	—	22 5	50	25 8	44	22
14	19	.031	—	—	24 15	45	28 8	39	21
15	22	.036	—	—	28 14	39	33 0	34	20
16	25	.041	—	—	32 13	34	37 8	30	19
17	28	.046	—	—	36 12	30	42 0	27	18

MEM.—If sheet zinc contains any *iron* in its composition, it will not resist the action of the air, and is no better than damaged or inferior galvanised iron. It is essential that it should be perfectly malleable, or it will crack with too sudden changes of temperature ; the best test of its malleability is to double the corners backwards and forwards, which ought not to crack it.

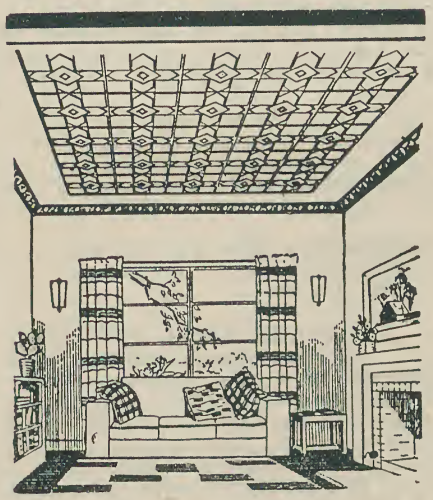
Care must be taken to allow for *contraction* and *expansion*, which may be effectually guarded against if properly laid.

Labor to zinc and galvanised iron is about the same. *See* Plumber.

APPROXIMATE WEIGHT OF ONE CUBIC INCH OF VARIOUS METALS.

	lbs.		lbs.
Platinum...	0.78	Nickel	0.31
Gold	0.69	Wrot. Iron	0.28
Mercury	0.49	Steel	0.28
Lead	0.41	Cast Iron	0.27
Silver	0.36	Tin	0.26
Bismuth	0.35	Zinc	0.26
Copper	0.32	Antimony	0.24
Brass	0.31	Aluminium	0.094

STAMPED STEEL CEILING.



Steel Ceilings material in 6 x 2 sheets.

Diapers, 3/3 to 3/6 per sheet.

Panellings and mould sheetings, Border Panels, 3/9 to 4/– per sheet.

Labour, including battens, per sq. yard., 4/6 to 5/6, 7/– to 8/–.
Wall Linings, steel, size, 6′ x 2′, 3/9 to 4/6.
Imitation tile sheeting, 3/9 to 4/–.
Gal. steel, 4/6 to 4/10.
Wall linings up to 6/3 per sheet 6′ x 3′.
Labour fixed, from 1/6 to 3/– per sq. yard extra.

METAL WORKER.

Metal Letters built or cast.

Cast letters not on list (up to 12″ high) in Zinc, copper and brass, 3/– extra.

BUILT BLOCK LETTERS.

	Zinc with Bolts	Copper with Bolts.	Polished Brass with Bolts.		Zinc with Bolts.	Copper with Bolts.	Polished Brass with Bolts.
5in. high	3/9 ea.	5/– ea.	7/3 ea.	12in. high	6/3 ea.	10/– ea.	13/6 ea.
6in. ,,	4/– ,,	5/6 ,,	7/9 ,,	15in. ,,	8/– ,,	13/6 ,,	17/9 ,,
7in. ,,	4/3 ,,	6/– ,,	8/6 ,,	18in. ,,	10/– ,,	17/6 ,,	23/– ,,
9in. ,,	5/– ,,	7/3 ,,	10/3 ,,	24in. ,,	15/3 ,,	28/– ,,	36/– ,,

ENAMELLED BRONZE LETTERS.

2in. high, 6/6 each, 3in. high, 7/6 each, 4in. high, 8/6 each, 6in. high, 11/6 each, 9in. high, 16/6 each, 12in. high, 22/6 each, 15in. high, 42/6 each, 18in. high, 60/– each.

Colours :—Ivory, Yellow, Turquoise, Cobalt Blue, Pea Green, Malachite, Red and Black. Prices include Bolts for fixing.

CHROMIUM PLATED ENAMELLED LETTERS—Add 33⅓%.

NAME PLATES.

Cast Bronze Enamelled Plate, size, 12″ x 3¼″ (Based on a maximum of nine letters to each plate.) ... each 2 5 0
Cast Bronze Enamelled Letter Box Plate, size, 10½″ x 4½″ ,, 3 5 0

For further information, see advt., pp. 1, 19.

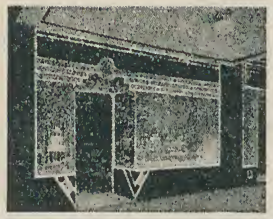
Triangular Brass Stair Rods, 27in. x ⅜in. per doz. 1 5 0
Eyes to suit, per doz. ... ... 5/– to 0 6 0
Ditto, 27in. x 1in., per doz. 2 0 0

DRAWN METAL MOULDINGS.

For Shop Fronts and Show Cases.

Shop Fronts and Show Cases—In Stainless Steel—Bronze—Nickel Silver. Send Plan or particulars of new or old shops to which modern window construction is desired, and Wunderlich Ltd. will assist you with original suggestions and designs, together with quotations.

The following prices apply for Mouldings in polished Copper, Brass or Bronze. **Polished Silverite is 10% extra on list rates ; Polished Monel Meral is 20% extra** on list rates. Many of the sections can be drawn in **Polished Staybrite stainless steel and are available at an advance of 25% on the list rates shown.** Send for a copy of Folder M.86, illustrating full size sections of the various moulding.



Unless marked T.P., the prices quoted do not include the cost of Tailpieces for which when attached, a rate of 4d. per lineal foot supplied, will be charged extra. Saddle beads are extra at the following rates :—

Under 1″ ... ... 2d. per lin. foot.
Exceeding 1″ ... ... 3½d. per lin. foot.
Stuck Beads are extra at ... ... 1½d. per lin. foot.

All prices are "per lineal foot." Any special cutting, mitring, fitting, etc. when required, will be charged extra, according to actual cost.

When invoicing, the established trade custom is followed of charging as 6″ all measurements under 6″, and as 12″ all measurements over 6″ but up to 12″.

Cataloque Price. No. per lin. ft.	Catalogue Price. No. per lin. ft	Catalogue Price. No. per lin. ft
1201 ... 1/3	12198 ... 1/10	12318 ... 2/2
1213 ... 1/6	12210 ... 1/6	12321 ... 2/–
1263 ... 1/9	1221 ... 1/9	12335 ... 1/8
1265 ... 1/4	12228 ... 1/2	12342 T.P. 1/8
1267 ... 1/3	12231 ... 1/8	12345 T.P. 1/6
1267 B.... 1/4	12234 ... 1/7	12359 ... 1/8
1268T.P. 1/3	12236T.P.1/8	12360 ... 2/–
1269 ... 1/3	12240T.P.1/5	12369 ... 1/9
1273 ... 1/8	12244 ... 2/2	12375 ... 3/6
1281T.P. 1/6	12245 ... 2/2	12378 ... 1/4
1284 ... 1/3	12248 ... 1/8	12379 ... 1/2
1286 ... 2/8	12250 ... 1/6	12381 ... 1/6
12000 ... 1/9	12251 ... 2/3	12389 ... 1/6
12110 ... 4/3	12256 ... 1/4	12399 ... 1/2
12160 ... 1/6	12257 ... 1/9	12404 ... 1/9
12161 ... 1/10	12269 ... 2/7	12426 ... 1/6
12162T.P. 1/4	12292 ... 2/8	12427 ... 1/6
12164 ... 1/7	12293 ... 2/–	12428 ... 2/6
12166 ... 1/11	12303 ... 2/6	12429 ... 3/–
12178 ... 1/9	12307 ... 1/8	12430 ... 1/9
12181 ... 3/–	12308 ... 2/2	12432 ... 2/4
12185 ... 2/1	12309 ... 1/8	12433 ... 1/8
12194 ... 1/5		12434 ... 1/6

FLAT BARS

½″ x ½″ ... 1/3
½″ x 1⅛″ ... 1/6
½″ x 1½″ ... 1/8
½″ x 2″ ... 1/11
½″ x 2⅝″ ... 2/3
½″ x 3″ ... 2/5

Counter Nosings

Drawn Section only exclusive of constructional woodwork shown.

No. 1 ... 2/5
No. 2 ... 6/–
No. 5 ... 3/– lineal foot
No. 6 ... 1/3
No. 8 ... 5/–
No. 9 ... 3/4
No. 10 ... 3/–

Ornamental Stamped Transomes

Prices on application

Caps & Bases, per set

12132 ... 12/–
12134 ... 12/–
12136 ... 12/–

Sales Tax Extra.

Further particulars, *see adv. pp.* 1 and 19.

LIGHTNING CONDUCTORS.

Market Price of Copper, £90 per ton.

	£	s.	d.
Lighting Conductors, **tape,** 1⅛in. x ⅛in., per 100ft. ...	8	0	0
Ditto do. do. rope, ½in. dia., per 100ft. ...	9	0	0
Elevating **tune** and **terminals,** complete	3	4	0
Copper **Earth Plate,** 24in. x 12in. x ⅛in., each	1	5	0
Lightning Arresters, Automatic, each	2	5	0
Plain solid **copper point,** with coupling for rope end, and copper elevating tube, 4ft. long	2	5	0
Copper holdfast clips, each 6d. Insulators, each ...	0	1	0

In using copper tubes or hollow balls it is necessary that all points of junction or contact should be sweated or soldered so that the inside cannot be impaired by dust or dirt.

Labor, fixing, from, per ft. run ... ... 1/– to 1/6

Angle Strips or Staff Beads, steel, **Wall Corner Protectors** with anchor attachment, per ft. ... 6d. to 1/–

Extra for **Nickel Plating** ½″ pipe, 8d. ft., ¾″ pipe, 11d. ft., 1″ pipe, 1/2 ft., 1½″ pipe, 1/8 ft.

STAIR TREADS

Stair Tread, polished corrugated brass, drawn, and nosing protector, per ft. run, with 2½in. width nosing 3/–

Stair Tread, cast brass, chequered ... 1/6

All lead 3in. with ¾in. nosing, per ft. run 1/6

Lead filled treads, 3½in. wide, without nosing, per ft. run ... 1/6

Lead filled treads, 2¼in. wide, without nosing, per ft. run ... 1/–

All Brass, 1½in. nosing and flange 1/6

Ditto, 2in., without nosing 2/3

Ditto, 2in. with nosing 2/9

Ditto, 2½in. brass, with nosing 3/–

Composition Stair Treads, per ft. run, 2in. wide, 10d.; 3in., 1/3; 4in. ... ... £ s. d. 0 2 0

WUNDERLICH ART METAL CEILING CENTRE FLOWERS.

(Perforated or Plain).

No. 60—11¼″ sq.	...	2/9	ea.
337—22 x 13½″	...	5/6	,,
50—12¾″ dia.	...	3/–	,,
52—14″ ,,	...	3/5	,,
88/89—12″ sq. or rd.		3/–	,,
,, 18″ ,,		4/7	,,
,, 24 ,,		7/–	,,
89—36″ dia.	...	25/–	,,
1095—18″ ,,	...	4/9	,,
1094—15½″ ,,	...	3/9	,,
No. 82—23″ dia.	...	5/10	ea.
1084—18″ sq.	...	4/9	,,
1463—15½″ dia.	...	3/9	,,
1096—20¾″ ,,	...	5/3	,,
55—18″ ,,	...	4/7	,,
1626—24″ x 24″ steel		6/3	,,
1477— ,,		6/3	,,
335—20″ dia. zinc		5/3	,,
907—31″ ,, ,,		9/6	,,
561— 6″ ,, ,,		1/11	,,

See Manufacturers Advt., pages 1 *and* 19.

MASONRY

In estimating the cost of **cubed** or **dimension stone** at per *cubic foot* first take the average size of the stones required, and the cost of such stones delivered on the work. Take next the number of superficial feet of face-work on the stone, then the number of feet super, of dressed beds and joints in the same stone, add the cost of setting the stone, and you cannot fail to arrive at a correct estimate of the net cost and description of masonry, to which add profit according to the total cost of work and the time required to finish it.

The different portions of masonry should also be classed as follows, if estimating at per cubic foot :—

One-face work, as ashlaring, or common face-work, base courses, plinths, friezes, &c.

Two-face work, as quoins, imposts, architraves, parapets, &c.

Three-face work, as copings, strings, cornices, pilasters, &c.

Four or more face work, as newels and caps, to ditto, blocks to cornices, chimney caps, &c. By such means the defective system of estimating may be pruned of much of its uncertainty ; the proper, and the most correct method, being to estimate the rough stone at per cubic foot, and the labor in dressing at per foot super.

Tooled margins, if round rock or quarry face, which is not measured, to be taken by the foot super, at double their width.

Raised work to be measured as *flat* work, the margins being taken as sunk work.

Masonry and stone-cutting.—The remarks under these headings will include every description of stonework. The setting or fixing and mortar is generally added to the cost of stone at per cube foot. All metal work, such as joggles, cramps, bolts, &c., or running in lead or sulphur is reckoned by the pound.

N.S.W. MASONS' AWARD, 1938.

	Rate per hour. s.	d.
Stone Carvers	3	$9^{19}/_{20}$
Stone Carver's Assistant	3	$4^{19}/_{20}$
Stone Machinist	3	$1^{19}/_{20}$
Operating Surfacing	3	$4^{19}/_{20}$
Planing Machine	3	$1^{19}/_{20}$
Stone Polishers	2	$6^{1}/_{22}$
Polishers' finishers	2	$6^{1}/_{22}$
Stone Masons	3	$1^{19}/_{20}$

Sawyers, $2/4^{1}/_{22}$; Adult Assistant, $2/3^{6}/_{11}$; Youths, 32/3 to 70/9 per week, according to age.

Rubble and Stone Masons, building trade, $3/1^{19}/_{20}$; Setters, $3/1^{19}/_{20}$ Stone Setters, $3/1^{19}/_{20}$; Rubble Masons, Kerb and Gutter, $3/1^{19}/_{20}$. Rubble and Stone Mason's Labourer, $2/3^{6}/_{11}$.

LABOR RUBBLE MASONS' AWARD, PIECEWORK.

Per Perch of 16½ feet x 18 in. or less.

	s.	d.
Class 1—Random rubble uncoursed (hammer dressed) ...	9	6
Class 2—Random rubble built in courses	10	11
Class 3—Squared rubble (uncoursed)	22	6
Class 4—Squared rubble built in courses	22	6
Class 5—Coursed rubble	20	11

In all classes of work above 5 feet in height, a further 2/4½ per perch extra, and a further 2/4½ for each additional 5 feet in height.

FOUNDATIONS AND DIMENSION STONES.

Scappled Stone at Different Australian Quarries.

Based on 3/– per hour.

	Free-stone. s.	d.	Blue-stone. s.	d.
Footings in 12in. through stones, per perch of 25 cubic feet	34	0	36	0
Parapet, scrappled on both sides, per perch, 25 cubic ft.	50	0	52	0
9in. ashlar, 33 lin. ft., per perch	34	0	34	0
Rubble, per perch, of 25 cubic feet	7	0	11	0
Lintels, steps or sills (12 x 6), at per lin. ft. ...	2	0	2	6
Cartage, per perch, rubble	6	0	10	0

DIMENSION STONES.

Dimensions, stones, from 6 to 12 cubic ft., per cubic ft.	3	0	3	6
Ditto, 12 to 24 cubic feet	3	6	4	6
Ditto, 24 to 36 cubic feet	4	0	5	0
Ditto, 36 to 48 cubic feet	5	0	5	6
Ditto, 48 to 60 cubic feet	6	0	7	6
Flag stones, rough, 4 inches	2	0	4	0

If more than 4 ft. deep on natural bed one-third more than these prices.

CURBS, GUTTERS, CUBES.

	s.	d.	s.	d.
Cubes or paving stones, 4 x 9 x 12, or 15in., per cub. yard	9	0	16	0
9in. pitchers, 9 x 9 x 9, per super. yard	8	0	14	0
Curbs, for footpaths, c., 13 x 6, per foot ...	1	6	2	0
Ditto, 18 x 8	2	0	2	8

GRINDSTONES.

Grindstones, 6in. wide :—2ft. dia., 20/–; 2ft. 6in., 28/–; 3ft., 50/–; 3ft. 6in., 70/–; 4ft., 120/–; 4ft. 6in., £8.

Ditto, 10in. wide :—3ft. dia., 70/–; 3ft. 6in., 94/–; 4ft., 150/–; 4ft. 6in., 200/–.

Gate Cap.—An octagon pointed or pyramidal gate cap in Sydney freestone, about 22in. by 22in. by 30in. high, took a stone-cutter 48 hours to dress it, or at the rate of 6 hours per cube foot; this at 3/– per hour = 18/– per cube foot for labor only without *sharps* or profit.

Curved Pediment in Sydney freestone, with cornice under; size of stone, 6ft. 8in. x 2ft. 4in. x 2ft. = 31 cubic feet.

	£	s.	d.
Beds and joints, 25ft. x 2ft. = 50 super. feet at 1/3	3	2	6
Rubbed curved face, 3ft. x 1ft. = 3 super feet at 3/–	0	9	0
Ditto curved and moulded, largest girt, 30 super feet at 6/–	9	0	0
Banking and superintendence, 31 c. ft., at 7d.		18	1
8/9 per cubic foot for labor only = ...	13	9	7
All materials add 31 cubic feet stone at 2/–	3	2	0
Setting and cement mortar, 31 cubic feet at 2/6 ...	3	17	6
	20	9	1

31 cubic feet = 13/2 per cubic foot cost price.

Galvanised iron cramps and bond irons about $2\frac{1}{2}$ x $\frac{1}{4}$, used in Government buildings in Sydney, equal to about 1lb. to 5 cubic feet of masonry.

SANDSTONE QUARRIED AND DRESSED.

Pyrmont Stone.

	Per foot. s.	d.
Window sills, 12 x 6 weathered and throated, 3ft. to 7ft. daylight	6	0
Ditto, sunk, weathered and throated	7	0
Ditto, larger sills, per cubic foot	7	0
Steps, 12 x 6, tread and riser, dressed, bedded and jointed	5	0
Copings and plain, 10 x 12, one clean face, and cham., from ...	6	0
Ditto, splayed and throated, 12 x 6, two clean faces and cham., from	7	0
Round Top, 12 x 3, for steps and garden coping	3	0
Kerb and Guttering, 12 and 18 x 9, sawn faced	5	4
Building Rubble, at Sydney and suburban quarries, per perch ($16\frac{1}{2}$ feet)	7	0
Squared Rubble, ditto, per perch ($16\frac{1}{2}$ ft.)	12	0
Base Course, 12 x 12, per cubic foot	2	0

Memorandum.

Mortar required, per perch—

Rubble contains about 5 cubic feet of mortar.

Ashlar, about 2 cubic feet.

Solid Masonry, from 1 to $1\frac{1}{2}$ cubic feet.

To obtain these proportions of mortar, use one bushel of sand for each cubic foot of mortar required, in addition to the usual proportion of stone lime.

The Oamaru Free Limestone is similar to the South Australian free limestone, is very soft and easily cut with handsaw. (See Building materials of South Australia at the end of this book.)

LABOR ONLY, PER FOOT SUPER.

Based on 3/– per hour.

	Spring Sandstone		Bay Basalt		Bluestone or Sydney Sandstone	
	s.	d.	s.	d.	s.	d.
Labour Sydney Sandstone—						
Clean Chiselled, per square foot	3	6				
If Rubbed	3	0				
Joints and Beds ...	1	3				
Punched Work	0	8				
Pitched quarry face	0	2	0	4	0	2
Axed, dressed for beds and joints	1	6	3	0	1	3
Axed and draft...	1	9	3	6	1	6
Clean chiselled sandstone	3	0	6	0	2	6
Clean chiselled and rubbed	3	6	—		3	0
Punched work	0	9	1	4	0	8
Vermiculated work, sharp arrises ...	6	0	12	0	5	0
Special turned Sydney sandstone, md. pillars, 2ft. x 6in. x 6in. cost, 20/– each						
Mouldings, tooled and rubbed large per foot super	4	0	8	0	3	4
Mouldings tooled and rubbed under 6ft. ...	6	0	12	0	5	0
Ditto, close members per foot run.						

Gothic or undercut mouldings, one half more on account of extra sinking and undercutting.

Machine cutting, dressing and moulding prices have been reduced from 20 per cent., according to quantity of each kind and dimensions.

LABOR ON VARIOUS STONES.

Wages 3/– per hour.

For Bowral Trachyte, reckon 3 times on Sydney sandstone.

If in **Cooma,** N.S.W., **Soft Granite,** reckon the same as for bluestone.

For **Brisbane** or **Mount Somers Sandstone** reckon same as for Sydney sandstone.

If in **Moruya,** N.S.W., **Grey Granite,** or **Adelaide Marble,** or the **Grampian** (Vic.) **Granite,** reckon one-half more than bluestone.

But if in **Gabo Island Red Granite,** or **Harcourt** (Vic.,) **Grey Granite,** reckon double the cost of similar work to bluestone.

THE RELATIVE PROPORTION.

For fine axed or finest chiselled plain face per super. foot is—	s.	d.
For **Oamaru**, New Zealand, **Free Limestone**	1	0
Barrabool Hills or **Darley Free Sandstone**	1	6
Waurn Ponds Free Limestone	1	10
Sydney sandstone, Pyrmont, Mount Somers or Brisbane Free Sandstone	2	6
Spring Bay Sandstone	3	0
Brisbane Porphyry	4	0
Stawell Sandstone	4	0
Bluestone, or Cooma Granite	6	0

Adelaide marble, or Grampian (Vic.) or **Moruya** (N.S.W.) Granite, 9/6 to 10/6.

And for **Gabo Island** or S.A. **Red Granite,** or **Harcourt Granite,** 13/6 per super foot.

RELATIVE COST OF STONECUTTING MOULDINGS.

Labor only, per foot run, 3/–.

	Sydney Sandstone		Spring Bay Sandstone		Oamaru Freestone	
	s.	d.	s.	d.	s.	d.
Single bead, reed or flute, ¾ inch or inch ...	1	0	1	4	0	6
Double, do., do.	1	4	1	8	0	8
Treble do. or moulded	2	0	2	6	1	0
Diminished flutes, from 1 inch to 2 inches diam.	1	6	1	10	0	10
Ditto, from 2 to 3 inches do.	2	0	2	6	1	0
Ditto from 3 to 4 inches do.	2	4	2	10	1	2
Ditto, from 4 to 5 inches do.	2	6	3	2	1	4
Add one foot for each mitre in panels or returns.						
Holes jumped or drilled for bolts, &c.,	5	0	6	0	2	0
per foot by pat. air compressor drills, 1½ dia.	6	0	7	6	3	6
Ditto ditto, 2 inches diameter	7	0	8	6	4	0
Ditto do. 3 inches do.	9	0	10	0	5	6

Brisbane and Mount Somers Sandstone, same as Sydney sandstone.

Detail Stone Cutting

Labor only each.	Sydney Sandstone		Spring Bay Sandstone		Oamaru Freestone	
	s.	d.	s.	d.	s.	d.
Mortice for iron rails, &c., 1 inch sq. ...	0	10	1	0	0	6
Ditto do. 2 do.	1	0	1	4	0	8
Ditto do. 3 do.	1	6	1	10	0	10
Dentules, 2 inches deep on face, with band ...	0	10	1	2	0	6
Ditto, 4 do. do.			1	10	0	10

Detail Stone Cutting

	Sydney Sandstone	Spring Bay Sandstone	Oamaru Freestone
Triglyphs and guttæ or drops, for 12 inch Doric column	6 0	8 0	3 6
Ditto, 24 inch do.	9 0	10 6	5 0
Ball for foot or finial 6 inches diam. ...	15 6	20 0	8 0
Ditto 8 do.	18 0	21 0	10 0
Ditto 12 do.	20 6	23 0	12 0
Balusters, either round or square, if 4in. largest diam., or side, and 12in. high ...	18 0	23 0	10 0
Ditto, if 4in. diam., or side, and 18in. high ...	20 0	25 0	10 6
Ditto, 8in. do. and 24in. high ...	22 0	28 0	12 0

STONE SETTING.

Average cost of architrave jamb. 10ft. x 2ft. x 1ft., front and reveal rubbed, including mouldings, 21in. girt, reveal bevelled, side checked, all other faces clean chiselled, *cost* 9/– *per cube foot, labour only*, in Sydney sandstone, exclusive of setting, mortar, cramps, stone, &c.

Proportionate cost of sunk and circular work.—Sunk work, 3in. deep, one-fourth more than similar straight work.

Sunk work, 6in. deep, one-half more.

Circular work, from one-third to one-half more than similar straight work.

Circular-circular or spherical, from two to four times, according to sharpness of curve.

SETTING CUBE STONES.

Labour and Mortar, per foot cube.

	s.	d.
Setting ashlar facing, 4½in. to 14in. on bed and less than 1½ c. ft.	1	4
Setting freestone, bluestone, or granite in blocks not more than 3 cubic feet, including scaffolding, haulage, cramps, lewis and grooves	1	0
Ditto, if carved or moulded, do.	1	4
Ditto, block from 2ft. to 6ft. long, do.	1	6
Ditto, do. if moulded or carved above 6ft. long	2	3
Dressing and **setting** Footings, per perch	15	0
Ditto. do. Rubble in walls, per perch. See award 9/– to	20	0

For every 10ft. in height above 40ft., add one-fourth the above rates. One lb. cramps will do from 5ft. to 10ft. of masonry.

CARTAGE.

Carting bluestone, granite, or sandstone, one mile, per ton. (*See* "Weight of Materials") ... ... from	3/6 to 5 0
Add for each mile beyond, per ton	1 6
Carting rubble, per perch (measured in wall), one mile	5 0 to 8 0
Add for each additional mile	1 6 to 2 0

EXAMPLES OF ESTIMATING.

Stone Cornice (Sydney freestone) on 14in. brick wall.

	s.	d.
Stone delivered 2.0 x 1.0 = 2 cube feet at 2/6	5	0
Setting and mortar, 2 cubic feet at 1/6	3	0
Mouldings, 24in. girt, cut and rubbed, 2 sup. feet at 5/– ...	10	0
Weathering, chiselled and rubbed, 1 sup. foot	3	0
Beds and joints, about 3 sup. ft. at 8d.	2	0
Per lineal foot	23	0

Or 11/6 per cube foot = cost price.

Cartage within one mile of depot, 5/– per ton.

TRACHYTE.

Delivered on Rail or Steamer, from Bowral, N.S.W., Quarries.

	s.	d.
Footings and cube stones, quarry dressed, to 20 c. ft.; per c. ft. (*Large blocks as per arrangement*).	7	6
Rough slabs for Coring, 3in. thick, per sq.ft.	2	6
Ditto. do. 9in. thick, per sq. ft.	3	9
Kerbing, 12in. x 18in., sawn face and edge, chamfered, square jointed, per lineal foot	8	6
Guttering, 18 x 6 do. do. do. ...	6	6
Paving Cubes, 9in. x 4in. x 6in., for cartways, per 100 ...	50	0
Flagging, sawn and squared, 3in. thick, per sq. ft.	9	0
Landings, up to 6in. x 20 sq. ft.	12	0
Steps, 12 x 6, sawn tread and riser, per sq. ft.	15	0
Girder Bearers, Corbels, and other dimension stones, per cub. ft.	12	0
Labour, Polishing flat surfaces Trachite, exclusive of axing, per sq. ft.	7	6
Red and Grey Granite, in the rough, per cubic ft.	13	6

Labour on Trachyte, reckon 3 times for Sandstone.

See advt., p. 20.

BUILDING STONE AT ADELAIDE.

	s.	d.
Murray Bridge Limestone, a yellow limestone, hard and fine grain, 13 cub. ft. to ton. per cub. ft.	8	0
Tapley Hill Bluestone, a variegated brown stone (about 13 cub. ft. to ton), between a slate and a blue stone per ton, about a yard super, suitable for face work, per ton	24	0
Glen Osmond Bluestone Rubble, 14 cub. ft.	17	0
Tarlee (a mudstone) **Shale slate,** 17 cub. ft. to ton, per ton ...	30	0
Angaston Red Granite, on rail, per cub. ft.	8	0
Delivered to Adelaide, per cub. ft....	12	0
Harcourt Grey Granite, per cub. ft., from	11	0
Mintaro Slate, Melbourne 1½in. thick to 15ft. super, from per ft.	3	0
Sydney slate, Cookbundoon, 1½in. thick, under 7ft. long, per ft.	3	6
Labour, laying and jointing, 1½in. flags, per yard super ...	3	0

GRANITE (HARCOURT).

	s.	d.
On rail or wharf, Melbourne, per cube foot, up to 8ft. long—		
Dimension stones, under 35 cube feet, each	3	6
Dimension stones, under 80 cube feet, each	5	0

Facing Stones for Concrete Buildings, 6 inches thick and upwards.

Patent axed work per foot cube, from 16/– repeat work.
Moulding, according to members, from 20/– per foot lin.

Sawing and Polishing, *Per foot super., each face.*	s.	d.
Sawing Oamaru (New Zealand) or Geelong freestone ...	0	10
Sawing Sydney or Spring Bay free sandstone	1	2
Marble, Italian, sawing or polishing each face	3	0
Black Marble ditto.	5	0
Polishing Granite, Moruya, 6/–, and Harcourt	10	0
Sawing Malmsbury Bluestone	1	6

Polishing columns or other circular work add extra, as for circular stone cutting. The prices stated for polishing do not include the necessary dressing required to prepare for it.

Sandhurst Granite Columns, &c.

Polished Shafts, with swell. Per lin. foot.	Sydney s.	d.
Small size columns, per sup. ft.	90	0
Large size, ditto	80	0

Facing of Concrete Building.

Special Terracotta " Feance " work, 2 to 3 inches thick, panelled and cemented to face of Reinforced Concrete Buildings, cost plain worked facings, from 20/– per super. foot, according to quantity, and upwards.

For mouldings, breaks and openings according to design and finish details and manufactures terracotta facings for concrete buildings, surface Granite, Cream, Rose Tinted or tooled and Stroke Imitation, for Quotations, *See advt., p.* 3.
For further particulars, Loveridge & Hudson Pty. Ltd. advt., page. 20.

Red Granite facia 6in. thick, dressed and laid, per s. ft.	...	10	6
Ditto. smooth polished square edged and ends, do.	...	10	6

MARBLE MASON

MARBLE.

There is such a richness and variety of colour, combined with soundness, in our Australian Marbles—qualities that commend themselves to the Architect and Builder—with the result that many of the principal Government and Private buildings, also vestibules of our principal theatres, are now tastefully faced and ornamented by their introduction. For localities where found, *see* under Building Material of States.

WHITE SICILIAN MARBLE.

Net trade price.

Slabs, polished face, square edges—¾in., 5/9; 1in., 7/8; 1¼in., 9/–.
Borenore, ditto, Rouge—¾in., 6/–; 1in., 8/–; 1¼in., 10/–.
Ditto, Black (Molong)—¾in., 7/–; 1in., 9/–; 1¼in., 11/–.

Kalloola Marble, facing slabs—¾in., 7/6; 1in., 10/–; 1½in., 12/–.
Straw coloured streaked with gold.

Cudgegong Marble—¾in., 7/6; 1in., 10/–; 1½in., 12/–.

Grey Green Marble streaked with white, from ¾in., 8/–; 1in., 11/–
1½in., 13/–. These three latter marbles were used in interior of entrance to Union House, and with good effect.

Steps and Nosing, rubbed smooth, under 7ft.—

Width.	1in.	1¼in.	1½in.	2in.	
12in. and over 9in. ...	7/–	7/9	8/6	11/–	per lin. ft.
¾ risers, to 6in. x ¾ ...		3/6 to 4/–			,,

Moulding and Polishing—Labour:—
Fluted edge, 2/– to 3/6 per foot run.
2in. Moulding and Scotia, 4/– to 5/– per foot run.
Round nosed Edge, 1/– to 1/6 per foot run.
Rubbed Square Edge for Jointing, from 3d. to 5d. per lineal ft.

Labour, Award Rates.

Marble or Slate Steps and Risers—
At day rates, **Marble or Slate** or other steps with the tile risers to be paid for at the rate of 4d. per ft. run respectively.

LABOUR INCLUDING BED.

Labour—Fixing Verandah Nosings, including bed, per 6ft., 3d. to 6d.
Ditto Steps and Risers up to 4ft. long per step, 2/– to 2/6.

Laying ¾in. Tiles, black or white, 12in. sq., laid in cement, 6/– sq. yard.
Ditto do. 8 in. sq. do. 8/– sq. yd.

Facing Wall Work—

Ditto ¾in. **Facing** Walls, setting, including cement and pointing, from 4/– to 6/– sq. yd.
Ditto Fixing Dado Mouldings, 3in., per foot run, 3d.
Ditto Skirtings to bathrooms, 6in. x ¾in., per foot run, 2½d.
Copper Clamps, letting in and fixing, each, 1/3.
2 horse trolly load for city—
12 blocks of trachite, each 4ft. x 1ft. 6in. x 9in. thick.
Steam waggon load for city—
15 blocks of trachite, 4ft. x 1ft. 3in. x 12in.

STONE CARVING

Labour only, each item.

Add 20 per cent. for roughing out by mason.

	£ s. d. Spring Bay Stone.	£ s. d. Sydney Stone.	£ s. d. Oamaru Stone.
Ionic capital Grecian or Roman for 6in. column (major diam.) ...	2 16 0	2 5 0	1 6 0
Ditto 9in. do. do.	3 17 0	3 5 0	1 17 0
Ditto 12in. do. do.	5 7 0	4 10 0	2 10 0
Ditto 18in. do. do.	7 0 0	6 5 0	3 10 0
Ditto 24in. do. do.	10 0 0	8 10 0	5 0 0
Ditto 30in. do. do.	12 0 0	9 15 0	6 0 0
For quarter pilasters one-half and for bases one-fourth the above.			
If enriched, add 20 per cent.			
Modillions, Ionic, or plain moulded, 3in. projection	0 4 6	0 3 9	0 2 3
Ditto 4½in. do., plain moulded ...	0 6 0	0 5 0	0 3 0
Ditto, 6in. do.	0 7 6	0 6 3	0 3 9
Cantilevers or trusses, 9in. do. do.	0 10 6	0 8 9	0 5 3
Ditto, 12in. do. do.	0 15 0	0 12 6	0 7 6
Corinthian or composite capital for 6in. (major diam.) column ...	4 10 0	3 15 0	2 5 0
9in. do. do. ...	7 10 0	6 5 0	3 15 0
12in. do. do. ...	12 0 0	10 0 0	6 0 0
18in. do. do. ...	16 0 0	14 0 0	8 0 0
14in. do. do. ...	20 0 0	17 0 0	10 0 0
30in. do. do. ...	24 0 0	21 0 0	12 0 0
For quarter pilasters one-half and for bases one-fourth the above.			
Paterae or rosette (rich), 4in. diam.	0 7 6	0 6 0	0 3 6
Ditto 6in. do. ...	0 9 0	0 7 6	0 4 9
Ditto 9in. do. ...	0 15 0	0 12 6	0 7 6
Centre flower (rich) 12in. do. ...	1 2 6	0 19 0	0 11 3
Ditto 18in. do. ...	1 17 6	1 12 0	0 18 9
Ditto 24in. do. ...	2 15 0	2 6 0	1 7 0
Mask or head, 4in.	0 9 0	0 7 6	0 4 6
Ditto 6in.	0 18 0	0 15 0	0 9 0
Ditto 9in.	1 4 0	1 0 0	0 12 0
Ditto 12in.	1 10 0	1 5 0	0 15 0
Ditto 15in.	1 17 0	1 11 0	0 18 0

In carved work the stone is cubed in the rough; if prepared by the stone-cutter, the clean chiselling or boastering is reckoned by the super. foot, to which is added the cost of carving.

N.B.—In stone cutting the superficial measurement of girt is always taken, but when let at one price with the material, the length and breadth only are taken, and not the girt, for superficial measurement. Generally when the materials and labour are let together the same measurement is taken as for materials only.

	Spring Bay Stone.			Sydney Stone.			Oamaru Stone.		
	£	s.	d.	£	s.	d.	£	s.	d.
Acanthus leaf, 4in. long	0	6	0	0	5	0	0	3	0
Ditto 6in. do.	0	9	0	0	7	6	0	4	6
Ditto 9in. do.	0	12	0	0	10	0	0	6	0
Ditto 12in. do.	0	15	0	0	12	6	0	7	6
Lotus leaves, one-half the above.									
Oak or laurel wreath, 6in. diam. ...	0	15	0	0	12	6	0	7	6
Ditto do. 9in. do. ...	0	18	0	0	15	0	0	9	0
Ditto do. 12in. do. ...	1	4	0	1	0	0	0	12	0
Oak leaf and corn frieze, with leaves 2in. long, per ft. sup.	1	7	0	1	2	6	0	13	6
Ditto do. 4in. do. do. ...	1	1	0	0	17	6	0	10	6
Panels sunk and moulded from 9 to 12in. square, and 1½ to 2in. deep rubbed	0	15	0	0	12	0	0	7	6
If undercut, add from 25 to 50 per cent.									

CARVING MOULDINGS.

Per foot run.

Egg and dart moulding, 1½in. girt ...	0	4	6	0	3	9	0	2	3
Ditto do. 2in. do. ...	0	5	3	0	4	6	0	2	8
Ditto do. 3in. do. ...	0	6	0	0	5	0	0	3	0
Ditto do. 4in. do. ...	0	6	9	0	5	9	0	3	5
Rope or cable moulding, 2in. do. ...	0	3	0	0	2	6	0	1	6
Ditto do. 3in. do. ...	0	4	6	0	3	9	0	2	3
Guillochis moulding, single, 3in. ...	0	6	0	0	5	0	0	3	0
Ditto, 4in. ditto	0	7	6	0	6	3	0	3	9
Ditto, 6in. ditto	0	9	0	0	7	6	0	4	6
Ditto, enriched, add 50 per cent.									

N.B.—The whole of the above items are presumed to be prepared by the stone-cutter as required, if not, add from 20 to 25 per cent. for preparing the stone or roughing out, and 8 per cent. for mortar and setting.

Stone Carving, which is generally fixed at a considerable height above the observer, does not require the degree of finish or delicacy of outline required in wood carving, which is generally fixed much nearer to the eye. In all ornamental work the time required to model or carve a given *Piece* depends materially upon the degree of finish, or *minutiae*, aimed at.

If any of the above items are required in Barrabool Hills, or South Australian freestone, the price will be about one-half that given for Spring Bay stone; for bluestone twice the price of Spring Bay stone; and for Adelaide marble or Moruya granite about thrice the cost of Spring Bay stone.

See Loveridge & Hudson Pty. Ltd. advt., page. 20.

MOTOR LORRIES AND TRACTORS

OIL-PULL TRACTOR (4 WHEELED) (*Light Weight*), 15-25 H.P. KEROSENE.

Motor Power, twin-cylinder, 5⅞in. bore, 7in. stroke, **High Tension Magneto, Belt Pulley,** 16in. dia., 7½in., face, on crank shaft. **Carburettor triple heat control** of oil burning.

Three speeds, forward from 2 to 3 m.p.h., one reverse, price, £775.

Other sizes, 20-35 H.P., 30-60 H.P., which could haul a 12ft. **road grader.**

THE CLETRAC CATERPILLAR GRADER.

Extract from letter, W. L. Hunt, C.E., Shire Engineer to Byron Bay Shire Council, with reference to one of the above Tractors.

" The Cletrac Tractor has given every satisfaction in **haulage work of Shire,** and I now use it to **drive** a 12in. x 8in. **stone crusher,** the saving effected is astounding.

N.S.W. Govt. Ry. **Construction Werris Creek-Binnaway** branch. The superintendent, says on every class of work, including **rooter ploughing, scooping, draining, stump pulling, carting, and power work** with the pulley the work was done with a **Cletrac** at a very much lower cost and quicker than any other method.

Victorian State Electricity Commission in 1936 used these machines for ploughing, ditching, **road scraping, post hauling, hoisting,** in addition to **belt work** in country, where wheeled vehicles could not move.

T. Colin A Irvine, Road Contractor, Ouyen P.O., Mallee, N.S.W., 1936 : " I have used it on ploughing 14in. deep single furrow in heavy clay, also shifted with 6ft. scoop 1 cub. yard dirt each trip. Working costs averaging 4s. per chain of road for fuel, oil, grease, gear oil, and benzine for starting, for grubbing, ploughing, scooping and grading."

S.A. RAILWAYS ROSEWORTHY DAM CLEARANCE BY CLETRAC TRACTOR.

H. Byrne, Secretary to Chas. Atkins & Co., Contractors, writes : " The dam measures 100 yards square x 15ft. deep, and has batters of 1 in 1½, 1 in 2, and 1 in 3 of hard sunbaked earth. Time occupied for removing 600 cub. yards of earth, 3 days of 24 hours. Part of this time was taken up in experimenting with **snatch-blocks** and **cable.** Under **this method** the Cletrac Tractor is hitched both back and front, and travels on the level ground in front of the silt removed, in all weathers and conditions, .17 cub. ft. wheel scoop and a Rooter Plough being used when working on the extreme edge of the dam, hauling. The Tractor was tilted to 45 degrees and worked with success."

Fuel Consumption—	£	s.	d.
Kerosene—24 gallons at 2/0½	2	9	0
Grease—2lbs., at 1/3	0	2	6
Petrol—½ gallon at 3/7	0	1	9½
Eng. Oil—¼ gallon at 6/6	0	1	7½
Differential Oil—½ gallon at 6/6	0	3	3
	2	18	2
Labour—Two men, three days, at 14/– per day ...	4	4	0
Cost 600 cub. yds. about $2^5/_6$d. per yard.	£7	2	2

Agents :—for further information, British Standard Machinery Co. Ltd., 65 York Street, Sydney.

MOTOR LORRIES FOR CONTRACTORS & MUNICIPAL WORK.

30/40 cwt. **light weight Chassis,** 1 ton 18 cwt. + 30 cwt. body, £420. Steel tip body extra, £80.

4 ton **Standard Lorry,** GH6 model, long wheel base.

Chassis, unloaded weight, 3 tons 6 cwt. 2 qrs. + body allowance, 25 cwt., price £895.

Platform 16ft. 6in. x 7ft. **Driver's cab and windscreen,** price £74. Ditto 18ft. x 7ft., £90.

A nett load of 6 tons can be carried by substituting heavier springs, price £8 extra, and double rear wheels.

Electric Lighting sets for Lorries, including dynamo, battery and lamps, from £65, fitted.

Timber Jinkers, including driver's cab and screen, to take up to 10 tons, from £312.

Steel Tip Body, 5 or 6 cub. yards, overtype hydraulic ram, with cab and screen, from £293.

30 cwt. Dodge Truck, £330 ; 2½ tons, £410 ; 3 ton, £599. Open body. 11ft. x 6ft. 6in. x 14 in. hinged sides. Dual rear wheel. Sedan Cabs, 2½ ton, capacity, 2/3 c. yards. Tipping Trucks, either hydraulic hoist or manual. Wheel base, 13 feet.

COST OF RUNNING SPECIALISED.

4 ton **Leyland motor** wool from Darling Harbour Ry. Station to stores, up-grade, mostly on 80 miles per day basis, including wages, all charges, cost per ton mile, 3.1 pence ; with **trailer,** 2.5 pence.

4 ton **Lorry,** will carry 3 tons silver ore, Camden and Burragorang Hills country.

Load of ¾ tons on 4 ton platform 15ft. x 7ft. lorry, approx. cost at 80 miles per day, loaded both ways, 2.8 pence per ton mile.

MOTOR LORRIES FOR CONTRACTORS AND MUNICIPAL COUNCILS.
TABLE OF APPROXIMATE WORKING COSTS UNDER NORMAL CONDITIONS.
(Leyland Motors Ltd.).

THESE COSTS ARE BASED ON 250 DAYS TO YEAR, AND 5 DAYS TO WEEK, AND ARE APPROXIMATE ONLY. ACCORDING TO LOCAL CONDITIONS.

		5 Ton.			4 Ton.			3 Ton.			2 Ton.		
	Column No. ...	1	2	3	4	5	6	7	8	9	10	11	12
1	Miles per day ...	40	60	80	40	60	80	40	60	80	40	60	80
2	Cost of Chassis, with Platform ...	£1,257			£1,145			£918			£782		
3	Rubber Tyres, on 10,000 mile basis	£152	£228	£304	£118	£177	£236	£85	£127.5	£160	£82	£123	£164
4	Interest, 6% ...	£75.5	£75.5	£75.5	£69	£69	£69	£55	£55	£55	£47	£47	£47
5	Depreciation, 10%	£110	£110	£110	£102.5	£102.5	£102.5	£82.3	£82.3	£82.3	£70	£70	£70
6	Repairs per year ...	£45	£67.5	£90.5	£42.5	£63.5	£85.0	£40	£60	£80	£37.5	£56.5	£75.0
7	Drivers' Wages ...	£276	£276	£276	£266.5	£266.5	£266.5	£256	£256	£256	£246.0	£246.0	£246.0
8	Oils and Grease ...	£9	£10	£12	£9	£10	£11	£8	£9	£10	£7.5	£8.0	£8.5
9	Insurances	£31	£31	£31	£29	£29	£29	£25	£25	£25	£24.0	£24.0	£24.0
10	Petrol (2/– p. gall.)	£166.5	£250.0	£333.0	£144	£212.5	£287.5	£112.5	£166.5	£255.0	£100	£150	£200
11	Petrol Consumption, miles per gall. ...	6			7			9			10		
12	Motor Taxes ...	£25	£25	£25	£24	£24	£24	£20	£20	£20	£19	£19	£19
13	Total Yearly Cost	£890	£1073	£1257	£804.5	£954	£1110.5	£683.8	£801.3	£913.3	£633	£743.5	£853.5
14	Cost per Week ...	£17.8	£21.4	£25.1	£16.08	£19.08	£22.2	£13.6	£16.02	£18.2	£12.6	£14.8	£17.06
15	Cost per Day ...	£3.56	£4.28	£5.0	£3.2	£3.8	£4.4	£2.27	£3.20	£3.62	£2.52	£2.9	£3.4
		d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.
16	Cost per Mile ...	21.4	17	15.0	19.2	15.2	12.8	16.2	12.8	10.8	15.1	11.6	10.2
17	Cost per Ton Mile, loaded both ways	d. 4.28	d. 3.4	d. 3.0	d. 4.8	d. 3.8	d. 3.2	d. 5.4	d. 4.2	d. 3.6	d. 7.5	d. 5.8	d. 5.1
18	Cost per Ton Mile, loaded one way ...	d. 7.71	d. 6.12	d. 5.4	d. 8.64	d. 6.84	d. 5.76	d. 9.72	d. 7.56	d. 6.48	d. 13.50	d. 10.44	d. 9.18

Top Speed 16 m.p.h. ; third speed 9.7 m.p.h. ; second 6.4 m.p.h. ; reverse speed 2.3 m.p.h.

By the courtesy of Leyland Motors Ltd.(England) Sydney Manager I have been enabled to give the approximate cost of timing.

PAINTER

N.B.—In this as in all other cases where washes, fluids, or paint is applied, unless the timber is seasoned it will hasten its decay by retaining the pyroligneous acid found in all unseasoned timber. The following Australian timbers when dried or seasoned are said not to be molested by white ants, viz., the Jarrah and Turpentine. (*See* Index).

In measuring painting, allow for all edgings, sinkings, or girths. In iron railing, and other open work, it is usual to take the two sides as flat work, and ornamental or small work twice for each side including Louvre blinds or lattice work.

Sashes and Frames should be measured as plain surfaces, including the glass and the exposed part of frames, with linings, &c., which should be girted ; but if the squares exceed 3 super feet, then it is better to take the sash bars by the lineal yard.

MEMORANDUM.

White lead is the material for foundation of paint. **Linseed oil** is the vehicle and preservative, and forms a protective surface. The life of paint depends largely upon the quality of linseed oil used in the making.

Turps, the usual solvent, causes the paint to work freer and thinner and to cover more surface.

Driers causes skin to solidify by absorbing the oxygen.

Oxide of iron paints are the best for covering iron or metal, as they combine chemically with particles of surface covered.

The first coat on plaster or cement should be primed with thin red lead and gold size mixed with boiled oil. Flatting coats are mixed with turpentine only.

NOTES ON PAINTING.

A good even finish cannot be made of rough surface.

Two coat work is unsatisfactory.

Add more oil to paint on porous surfaces.

Do not thin paint with oil and driers to save labour, rub paint well into surface.

Add more turps for work to stand the sun and prevent blistering.

Clear white turps is better than yellow ; also pale linseed oil is better than a greenish yellow.

Do not put too much oil in second coat.

To soften and clean a hard set paint brush, make some turps hot in a fry-pan, and well rub and work brush in the boiling liquid.

TABLE SHOWING PRODUCTION OF TINTS BY MIXING.

Sky blue—White and Prussian Blue.
Coral—White and Venetian Red.
Silver Grey—White and Black.
Buff—White, Orange, Chrome and Oxford Stone Ochre ; or White, Yellow Chrome, and Oxford Ochre.
Azure Blue—White and Ultramarine.

PAINTERS AND DECORATORS UNION, 1938.

AWARD WAGES. N.S.W.

	hour
House and General Painters	2/6$^{7}/_{11}$
Ship Painters	2/7$^{7}/_{11}$
Signwriters, Tradesmen	2/8$^{7}/_{11}$
Special Shipping Gilders and Grainers	2/9$^{7}/_{11}$

APPRENTICE WAGES SCALE.

	Painters. per week.	Signwriters. per week.
1st year	15 9	16 10
2nd year	26 3	28 1
3rd year	36 9	39 3
4th year	47 2	50 6
5th year	62 10	57 4

Trainees add 25 per cent to above.

WAGES TAX. £3 per week and under **Exempt.**

£3/1/–	to £3/10/–	Single Men	10d.	Married Men	4d.
£3/10/1	,, £3/15/–	,,	1/1	,,	7d.
£3/15/1	,, £3/17/6	,,	1/2	,,	8d.
£3/17/7	,, £4/–/–	,,	1/3	,,	9d.
£4/18/1	,, £5/–/–	,,	2/4	,,	1/10
	£6/–/–	,,	3/2	,,	2/8
	£7/–/–	,,	4/4	,,	3/10

In the case of married men with children a further exemption of 6d. for each child is allowed.

For Insurance, see Insurance Co. advt., p. 26.

CONTRACT PRICES.

Cottages, Ordinary Material.

Ground floor openings—door and window, 4/6 per opening.

Painting.—One coat work, 1/–; two coat work, 1/6; three coat work, 1/9; four coat work, 2/6 per square yard.

PASTE FOR WALL PAPERS.

Dissolve 1lb. Rex dry Paste Powder in 2 gallons hot water, 1/– per lb.

Preventative in pastes against silverfish and bugs—Oil of Cassia and Camphor.

Cyanide rooms to kill vermin.

Dusseal. An efficient sealer for cement surfaces, also acts as a primer thus dispensing with one coat of paint—1 gallon tins, 19/– gallon.

Ormonoid Asbestos Paint. For protecting all bitumen and iron roofs and metal structures. Black, 7/– gallon.

Paint, to cover one coat, 100 square yards on average woods. 15lb. White Lead, ½ gal. of Linseed Oil, ¼ gal. Turps, ¼ lb. Dryers. Reckon Sandpaper, wear and tear on brushes, and putty.

DISTEMPER AND COLOURINGS—MATERIAL ONLY.

Kalsomine, Palm Brand, for interior decoration, to mix with hot water, 5lb. packets. Colours, 2/6 to 2/9 packet.

Millwhite, a finely ground Kaolin production. Can be used with oil and turps, but has a petrifying liquid as a fixer preparation.

Balm Cold Water Paint, 2/6. **Zenith Kalsomine,** 3/– per packet.

White Lead, 1 cwt. 58/6 ; ½ cwt., 30/– ; ¼ cwt. 15/6.

Raw Oil in tins, per gal., 5/6. **Boiled,** 5/9 per gal.

Turpentine—Genuine, in tins, 5/– per gal. **Mineral Turps,** 2/6 gal.

Enamels, united high grade, 39/– per gal.

Bronzing Lacquers, 15/– per gal.

Ferguson's Driers patent, –/10 per lb. **Terebine,** 14/6 per gal.

Dee Rust Paint, yellow 24/6 ; green, 30/6 per gal. One gallon covers 100 super feet.

" **Duco** " **Lacquer** wood finish sets quicker and is superior to French Polish. Being colourless, it covers on a smooth surface, 300 super feet per gallon.

Spraying Lacquers, all colours, 34/6 per gal. Maroons, 52/6. Auto Black, 29/– per gal.

Clear Lacquers for wood finish, brush, 20/– to 29/– per gal.

Metal Primers, dark oxide, 1 gallon, 30/–, 1 pint, 4/6.

Wood Metal Surfaces. White and grey, oil primer, 30/– per gal.

" **Duco** " **Priming Undercoat.** One gallon mixed with 25% linseed oil will cover 1,100 square feet. Price, 30/– per gal.

" **Craftex** " is a plastic paint supplied in powder form to be mixed with hot or cold water to a paste consistency. It can be applied with a brush or a steel trowel to any smooth even surface. " Craftex " is used for making wall finishes (interior only). Spreading capacity approximately two sq. yds. per 1lb. of dry powder. Cost on wall—material only (approx.) 6d. per sq. yd.

" **Craftcoat** " is a linseed oil base glazing medium, to be tinted with ordinary stainers ground-in-oil, and then used to colour over " Craftex " textures. It is also employed effectively on smooth wall and ceiling surfaces to produce mottled and variegated colour effects with the use of a chamois leather, or stippler brush. Spreading capacity of " Craftcoat " Approx. 40 sq. yds. per 8lb. tin (1 American gallon) approx. cost—material only—5d. per sq. yd. Architects should allow 4/– p.c. per sq. yd. for a complete texture wall finish executed in " Craftex " and coloured with " Craftcoat."

Craftex Size is no longer manufactured—a suitable substitute is Glue Size.

Further particulars on application to agents—*See Advt. page* 22.

APPROXIMATE COVERING CAPACITY OF 1st QUALITY PAINTS Etc.

Exterior House Paint, 850 sq. feet per gall.—one coat.

Oil Wall Paint (Matt Finish), 880 sq. ft. per gall.—on rough surfaces.

,, ,, ,, (Reduced 5% turps), 1,150 sq. ft. per gall.—on smooth walls.

Approx. Covering Capacity of 1st Quality Paints—(*contd.*)

Kalsomine, 350-500 sq. ft.—per 5lb. packet.
Cement Sealer, 300-320 sq. ft.—on cement.
„ „ 500-600 sq. ft. per gall.—on plaster.
Roofing Paint, 900-1000 sq. ft. per gall.
Silver Paint, 900-1000 sq. ft. per gall.
Flat Oil Stain, 500-600 sq. ft. per gall.
Varnish, 550-600 sq. ft. per gall.

Litharge and Red lead as a protective is unequalled when used as a priming coat on iron and steel work. Red lead for paint is manufactured in two grades, viz., Ordinary Red Lead, no organic colouring introduced to the lead oxide, and Non-Setting Red Lead remains in paste form when ground in refined linseed oil.

Gun and pot for lacquer spraying, £6 each. Filter for lacquer, £7/10/– each.

Cellulose or Lacquer Spray Paint, 34/– to 56/– per gallon. used with an " air gun." It is a clear varnish, brush or spray. For spray application, a 10% reduction with turpentine is recommended. Finishing coat, new or old work, two coats are necessary. 8 to 18 hours drying. This lacquer does not mix with paints or enamels.

Cement and Waterproof Paint. For interior and exterior concrete surfaces, plaster walls and brickwork. Also for protecting iron, steel, and gutters, etc.

Neuchatel Bituminous Paint, covers 15 to 35 sq. yards per gallon one coat, on smooth surfaces, 500 sq. feet per gallon. Two coat work for inside water tanks. Three for absorbent cement work. Price, 12/6 per gallon.

Automatic Spray Machines, for large surfaces. Have been used with success. Acetylene gas. 4 gal. capacity 9 10 0
Compressed Air Spray Gun, for distributing fine lacquer ... 12 10 0
Lacquers for front doors, to withstand heat and weather, or motor cars. In 5 gal. drums, 50/–. Chassis Black, 22/–; Thinners per gallon ... 1 1 0
Spartan wood stains, 11/6 per gallon.
Coloured transparent lacquers, 26/– to 28/– per gallon.
Deodoriser Spray Disinfectant, good and pleasant. For public Urinals. Nightingale Supply Co., 10 Mary St., Sydney (Oxford St.).

Applying Paint to Wall by Compressed Air.

Crane's Nitro-Lac, for use with Spray Gun. Industrial Lacquers, specially used for front doors or exposed surfaces. Will not peel or blister with the sun and weather like paint.
See advt., p. 2.

Apply **Anti-Bor-Ant** with spray or brush to all surfaces of timber before using same in infested localities. If infested, apply with fine syringe through borer hole. 16 oz. bottles, 3/3 ; ¼ gal. tins, 6/– ; ½ gal. tins, 10/– ; 4 gal. 70/–.

" Kerotin " Spray Pump, with hose and single spray, 25/–. For thin whiting, spraying, &c.

See Advt., p. 36.

De Vilbiss Spray Equipment. Portable Outfits from £95 upwards. Stationary Outfits, from £50 upwards.

This machine governs the sprayed liquid to a line almost. Excelsior Supply Co., 160 George St. West, Sydney.

TO MAKE WALLS WATERPROOF.

Sylvester's Process.—Castile Soap and Alum Coats.

First Coat.—Mix ¾lb. Castile Soap to one gallon of water ; apply with brush, allow 24 hours to dry, then apply.

Second Coat.—Viz., mix ½lb. alum to 4 gal. water ; after 24 hours repeat the coats. A chemical glaze is formed which is said to be impervious for years.

PATENT PAINTS.

Ferrodor Paint is a preservative paint for steel, iron, or timber. 1 cwt. covers when mixed, 713 sq. yards, and a gallon weighs 18½lbs. Red lead covers 377 sq. yds., and a gallon weighs 36½lbs. To thin the paint add 30lbs. pure Linseed Oil to 1 cwt. of paste. Red and Gray, 113/– cwt., other colours, 121/– upwards. *See advt., page* 6.

Petrifying Liquid, colourless wash for hardening and waterproofing stone, brick, or cement work. 12 gallons to cwt., per gal. 0 12 6

Bitumene Solution, 10 gallons=1 cwt., said to cover 45 sq. ft. per gal. 0 7 6

B. & P. Paints and Compounds, all colours, and for different purposes, per gal. from 0 6 0

Creosote, for preserving wood, per gal. 0 3 6

Economical method of treating fresh concrete before painting to neutralise the alkalies of the cement.—Mix equal parts in weight of zinc sulphate and water ; this mixture changes the caustic lime to calcium sulphate or gypsum.

" Bondex " Waterproof forms fine finish to walls and cement swimming pools. G. E. Crane. In white, and 16 colours, 25/– per gallon.

Sterling Varnish and Ready Mixed Paints are quality products and are guaranteed by the manufacturers to give satisfactory results. Items of interest to the Painter and Decorator.

Varnish, Hard Oak, 11/6, Copal, 17/6, Gold Size, 16/6, Black Japan, 11/6.

Home Paint. Usual colours, 19/3, Greens, 20/–, Reds, 23/9, Undercoats, 18/–.

Paving Paints. Reds, 15/9. Prices are for 1 gallon tins—smaller packages subject to usual extras.

Also a full range of Stainers and Lacquers etc.

Complete price lists on application.

Refer Advt. page 25.

PAINTING AND GENERAL SUMMARY (Knotting not included).

Labour based on 2/6 and material, per sup. yard.

Covering Plain Surfaces of Wrought Iron, Wood, in common colours, such as lead, stone, white, black, brown, chocolate, &c., including knotting and stopping.

	Each coat. s.	d.
Painting and Stopping (large surfaces) on weather boarding, &c., 1 coat	1	3
Ditto do. do. do. 2 coats	1	6
Ditto do. do. do. 3 coats	1	9
Ditto do. do. do. 4 coats	2	6
Ditto do. do. do. 3 coats and flatted ...	3	0
Painting window openings, 3/– each side.		
Varnishing, 2 coats, ordinary, and sizing, 2/2 ; best varnish ...	3	0
Running, ¼ to 1½ lines, any colour, per ft. run	0	4
Ditto do. do. in Duresco, per ft. run ...	0	3
French Polishing, handrails, per ft. run	1	0
Fine Distemper Kalsomining, Alabastien, Arabic, per yard ...	0	6
Duresco, or smilar finishing, coat stippled, per yard	1	2
Distemper, ordinary, any tint	0	6
Lime Washing, per coat	0	3
Wood Preserving Oil, at 1/6 per gal. ; per coat, per yard ...	0	1
Cleaning down and rubbing off old work, per yard ... 6d. to	0	9
Burning off and preparing old work, per yard	1	6
Ditto and sizing in one coat	0	7
Staining, sizing, varnishing, 1 coat	2	3
Ditto, varnishing, 2 coats	2	8

Work executed off ladders, add 10 per cent.
Close Picket Fencing, reckon 50 per cent. on plain work.
Close Lattice Work, reckon double measurement.

If wages or materials alter in price, reckon by percentage.

VARNISHING.

Varnish, 18/– per gal.	Materials. s.	d.	Labour. s.	d.
Spirit varnish, each coat, per yard	0	9	0	4
Varnishing once in best copal, per yard	0	11	0	4
Ditto, twice do.	1	2	0	8
For every additional coat, add	0	7	0	4

FRENCH POLISHING.

French Polishing, per foot super	0	1½	0	10
Ditto to columns fluted, per foot super	0	2½	1	2
Ditto, to handrails and small articles, per ft. run ...	0	1½	1	0
Polish, per gallon	12	6		

Before varnishing, the pores of the wood are filled with white size. For superior work after sizing the surface is either sand-papered or rubbed over with pulverised pumice-stone, which gives an even face

and fills up the pores of the wood. The best French polish is mixed and rubbed in with finely powdered pumice stone.

GRAINING, &c. Per yard super.	Complete. s.	d.
Plain Oak, combed and shadowed, from	3	0
Satin wood, coromandel, rosewood, bird's eye, maple, pollard oak, or Huon pine	3/6 to 5	0
Fancy Veined Marbling, including white ground	4/– to 9	0

WRITING COMPLETE.

Per letter per inch in height.		s.	d.
Plain painted letters, 1 to 4in.	Approx. ...	0	2
Ditto 5 to 7in. high	,, ...	0	1½
Ditto 8in. and over	,, ...	0	1
Egyptian or sunk letters	,, ...	0	4
Gold, plain or bronze, with gilt edges or colour ...	,, ...	0	8
If shaded, add 1d., if double shaded	,, ...	0	2
Writing on glass, plain burnished gold, with two shades, on coloured ground		0	10
Ditto, with three shades, ditto		1	2
Embossing and gilding ornamental letters with two shades on coloured ground		2	8

For German text, old English, ornamental or ancient writing, add 50 per cent to the above.

RECIPES.

Japan Black for Leather.—Burnt umber, 4ozs.; true asphaltum, 2ozs.; boiled oil, 2 quarts. Dissolve the asphaltum by heat in a little of the oil, add the burnt umber (ground in oil) and the remainder of the oil; mix, cool, and thin with turpentine.

Mahogany Varnish.—Gun amm., 8lbs.; clarified oil, 3 gal.; litharge and powdered dry sugar of lead, of each ½lb. Proceed as for body varnishes, and thin with oil of turpentine, 5 gal., or a sufficient quantity.

Turpentine Varnish.—Put 1 pint of turpentine into a bottle with 1½lbs. of white resin in powder. Dissolve in a gentle heat by placing the bottle in an iron pot surrounded by dry sand over a moderate fire.

A Cheap Oak Varnish.—2 quarts of boiled oil, 1½lbs. of litharge, ¾lb. gum shellac. All boiled together and stirred up till dissolved, then take off the fire and add 2 quarts of turps; when settled strain into a bottle and cork up for use.

Glass Cement Recipe, adhesive for glass or platter.—India rubber dissolved in gum mastic and glue, add half gelatine and isinglass. Melt together and thin with spirits.

Plain for Rough Woodwork.—6lbs. melted pitch, 1 pint linseed oil, and 1lb. yellow ochre.

How to Kill Grease Spots.—Before painting wash over smoky or greasy parts with saltpetre or very thin lime whitewash; if soapsuds are used they must be washed off thoroughly as they prevent the paint from drying.

To Cover Fibro Cement with a cold water paint add petrifying liquid with each coat.

Cure for Dampeners.—Bergers Dusseal, 19/– per gallon. For surface of old cement and new repairs when coated with above, will form a uniform finish ; the patches of damp new work do not show.

Finol in cement is also protective against damp.

To keep paint brushes soft when not in use, melt 5 lbs. of mutton fat in 2 gallons barley water.

Table of Oil Measure

At 9 lbs. to the gallon.

Per cwt.		Per gal.		Per cwt.			Per gal.			Per cwt.			Per gal.		Per cwt.			Per gal.	
s.	d.	s.	d.	£	s.	d.	s.	d.	£	s.	d.	s.	d.	£	s.	d.	s.	d.	
18	2	1	5½	1	7	6	2	2½	1	17	4	3	0	2	6	8	3	9	
18	8	1	6	1	8	0	2	3	1	17	10	3	0½	2	7	2	3	9½	
19	2	1	6½	1	8	6	2	3½	1	18	4¼	3	1	2	7	8¼	3	10	
19	8¼	1	7	1	9	0¼	2	4	1	18	10½	3	1½	2	8	2½	3	10½	
20	2½	1	7½	1	9	6½	2	4½	1	19	4¾	3	2	2	8	8¾	3	11	
20	8¾	1	8	1	10	0¾	2	5	1	19	11	3	2½	2	9	3	3	11½	
21	3	1	8½	1	10	7	2	5½	2	0	5¼	3	3	2	9	9¼	4	0	
21	9¼	1	9	1	11	1¼	2	6	2	0	11½	3	3½	2	10	3½	4	0½	
22	3½	1	9½	1	11	7½	2	6½	2	1	5¾	3	4	2	10	9¾	4	1	
22	9¾	1	10	1	12	1¾	2	7	2	2	0	3	4½	2	11	4	4	1½	
23	4	1	10½	1	12	8	2	7½	2	2	6¼	3	5	2	11	10¼	4	2	
23	10¼	1	11	1	13	2¼	2	8	2	3	0½	3	5½	2	12	4½	4	2½	
24	4½	1	11½	1	13	8½	2	8½	2	3	6¾	3	6	2	12	10¾	4	3	
24	10¾	2	0	1	14	2¾	2	9	2	4	1	3	6½	2	13	5	4	3½	
25	5	2	0½	1	14	9	2	9½	2	4	7¼	3	7	2	13	11¼	4	4	
25	11¼	2	1	1	15	3½	2	10	2	5	1½	3	7½	2	14	5½	4	4½	
26	5½	2	1½	1	15	9½	2	10½	2	5	7¾	3	8	2	14	11¾	4	5	
26	11¾	2	2	1	16	3¾	2	11	2	6	2	3	8½	2	15	6	4	5½	
				1	16	10	2	11½											

A Table of Turpentine Measure

8lbs. 10ozs. to the gallon.

Per cwt.			Per gal.		Per cwt.			Per gal.		Per cwt.			Per gal.		Per cwt.			Per gal.	
£	s.	d.	s.	d.	£	s.	d.	s.	d.	£	s.	d.	s.	d.	£	s.	d.	s.	d.
1	6	0	2	0	1	16	0	2	9	2	6	0	3	6	2	16	0	4	4
1	7	0	2	1	1	17	0	2	10	2	7	0	3	7	2	17	0	4	4½
1	8	0	2	2	1	18	0	2	11	2	8	0	3	8	2	18	0	4	5½
1	9	0	2	2½	1	19	0	3	0	2	9	0	3	9	2	19	0	4	6½
1	10	0	2	3½	2	0	0	3	1	2	10	0	3	10	3	0	0	4	7
1	11	0	2	4½	2	1	0	3	2	2	11	0	3	11	3	1	0	4	8
1	12	0	2	5½	2	2	0	3	3	2	12	0	4	0	3	2	0	4	9
1	13	0	2	6½	2	3	0	3	3½	2	13	0	4	1	3	3	0	4	10
1	14	0	2	7½	2	4	0	3	4½	2	14	0	4	2	3	4	0	4	11
1	15	0	2	8	2	5	0	3	5	2	15	0	4	3	3	5	0	5	0

DURABLE WHITEWASH.

(American Congress Recipe).

Used on " White House," Washington.

Slack ½ bushel of unslacked lime with boiling water, covered to keep in steam. Strain through fine sieve. Add a peck of salt previously dissolved in warm water ; 3lbs. ground rice, boiled to a thin consistency ; ½lb. powdered whiting ; 1lb. of clean glue, previously dissolved. Boil the mixture for an hour in a small kettle inside another.

Then add 5 gals. of hot water, stir it well, stand for a few days, and put on hot with fine or coarse brush, according to finish required. It remains brilliant for many years. Colouring matter may be added if desired. 1 pint covers 1 yard.

SUNDRIES.

Tarring.—One gallon of tar with 1lb. pitch will cover one square, or 11 super yards.

Caulking.—1 cwt. of oakum will do 700 lineal feet of seams in 2½in. planking, but on good work, with fine seams, half this quantity will suffice.

Chunam.—1 bushel fine sifted lime and 2 gallons best thin black oil, well mixed together, will be found a cheap and effectual substitute for white lead in T. & G. flooring for verandahs, &c.

Champion" Tar Boilers, Bitumen Kettles and Spraying Appliances Stocked in all designs and sizes

To prevent the paint or galvanised iron from flaking dissolve copper chloride, copper nitrate, and sal ammoniac, ½oz. each ; when dissolved add ½oz. hydrochloric acid to 1 gal. of water.

Method of Colouring Copper by oxidising the surface.—Make a paste of iron oxide and Graphite with wood alcohol : heat in oven ; the colour obtained will depend on the amount of iron oxide mixed and the time of heating ; protect the colour obtained with varnish or lacquer.

Brown colours are obtained by using a mixture of verdigris, sal ammoniac, 2 to 3 pints to 1 of vinegar ; heat in oven.

Blue-black and **Blue-grey** colours may be given to copper by dipping in hot " liver of sulphur " solution and thoroughly dipping or scratch brushing, again dipping and washing.

Litharge and glycerine makes a hard and **waterproof** coat to cement.

Plastic G is a cement to repair metal gutters down pipes, also wood and leaks of all materials, 1/6 per lb.

" **Cementon Cemorta** " water and fireproof, cost 3 coats, 2/– per yd.

To make **glue waterproof** add a little kromate of potash to the water.

Another method : Dissolve glue in linseed oil over a slow fire.

To treat plaster walls before painting, apply ½ gold size, ½ turps

WHITE ANT EXTERMINATOR AND INSECT DESTROYER.

One of the simplest and most effective ; used as a spray. Mix—arsenate of soda, 1lb. ; warm water, 4 gal., by adding molasses the insects become cannibalistic and eat each other.

RECIPES.

GOOD ROUGH PAINT FOR ROOFS AND OUTBUILDINGS.

Mix slowly 1 gal. crude petroleum with 3lbs. brown metallic. Thin down with a little coal oil. Apply as ordinary paint.

TO CLEAN PAINT WITHOUT DETERIORATING OR AFFECTING SAME.

Dip a piece of flannel or felt in hot water and powdered whiting and apply briskly.

Hot water and ammonia, a tablespoonful to a quart, wiped over surface to remove grease and dirt.

WHITEWASH.

2lbs. sulphate of zinc, 1lb. salt to ½ bushel of lime, will adhere firmly on wood or galvanised iron, forming a cooling covering.

COLOURED WASHES.

1 bushel of lime, 4lbs. yellow ochre, makes good cream colour.

2lbs. Indian red, 7lbs. amber, 2lbs. lamp black, makes good fawn colour.

7lbs. raw umber, 4lbs. lamp black, makes good buff stone colour.

CLEANING DOWN, &c.

Remove splashes from windows :—Hot solution of soda and water.

Remove splashes from floors.—Use turpentine.

To remove Paint or Varnish from woodwork or machinery—

(1) Dissolve 1lb. of potash in a gallon of water and apply with an old mop.

(2) Let it remain for ten minutes, when the paint will wash off

(3) The addition of a little hot lime is an improvement.

To stain wood Mahogany.—If soft wood is washed with a solution of nitric acid it will take on a brown stain having the appearance of mahogany.

TO REMOVE PAINT FROM BRICK WALLS.

Dissolve 10lbs. of caustic soda or saponified lye in 5 gal. of water, and stir into the solution 5 quarts mineral oil ; add enough sifted sawdust to make a paste. Plaster this thickly on the old paint, and in a few hours scrape off the dissolved substance. To repaint the wall, clean with water, and a coat of vinegar to neutralise the alkali that may have remained in the pores of the brickwork.

Or another.—Slack in one vessel a quantity of lime, and in another vessel dissolve same weight of soda ash, leaving overnight. Mix both together next day, adding enough whiting to make a paste, and apply this to the old paint. Well rinse the wall when the paint has been removed, apply a coat of vinegar before painting.

When **red bricks** of a fireplace become **discoloured** with soot or otherwise, rub with brickyard dust paste ; or paint the bricks with boiled linseed oil all they will absorb. This treatment may be repeated if the bricks are much discoloured.

FOR PLASTERERS, PAINTERS, PAPER-HANGERS, TUCK-POINTERS AND SURFACERS OF EVERY DESCRIPTION

Table showing number of square yards of wall surface in rooms of various sizes, *including* square yards of ceiling for same.

Square Yards and Feet of Walls in Rooms of various sizes 7-feet High, including Sq. Yards in Ceilings.

Size in feet	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
3	10.3	12.2	14.1	16.0	17.8	19.7	21.6	23.5	25.4	27.3	29.2	31.1	33.0	34.8	36.7	38.6	40.5	42.4	44.3	46.2
4	12.2	14.2	16.2	18.2	20.2	22.2	24.2	26.2	28.2	30.2	32.2	34.2	36.2	38.2	40.2	42.2	44.2	46.2	48.2	50.2
5	14.1	16.2	18.3	20.4	22.5	24.6	26.7	28.8	31.0	33.1	35.2	37.3	39.4	41.5	43.6	45.7	47.8	50.0	52.1	54.2
6	16.0	18.2	20.4	22.6	24.8	27.1	29.3	31.5	33.7	36.0	38.2	40.4	42.6	44.8	47.1	49.3	51.5	53.7	55.8	58.2
7	17.8	20.2	22.5	24.8	27.2	29.5	31.8	34.2	36.5	38.8	41.2	43.5	45.8	48.2	50.5	52.8	55.2	57.5	59.8	62.2
8	19.7	22.2	24.6	27.1	29.5	32.0	34.4	36.8	39.3	41.7	44.2	46.6	49.1	51.5	54.0	56.4	58.8	61.3	63.7	66.2
9	21.6	24.2	26.7	29.3	31.8	34.4	37.0	39.5	42.1	44.6	47.2	49.7	52.3	54.8	57.4	60.0	62.5	65.1	67.6	70.2
10	23.5	26.2	28.8	31.5	34.2	36.8	39.5	42.2	44.8	47.5	50.2	52.8	55.5	58.2	60.8	63.5	66.2	68.8	71.5	74.2
11	25.4	28.2	31.0	33.7	36.5	39.3	42.1	44.8	47.6	50.4	53.2	56.0	58.7	61.5	64.3	67.1	69.8	72.6	75.4	78.2
12	27.3	30.2	33.1	36.0	38.8	41.7	44.6	47.5	50.4	53.3	56.2	59.1	62.0	64.8	67.7	70.6	73.5	76.4	79.3	82.2
13	29.2	32.2	35.2	38.2	41.2	44.2	47.2	50.2	53.2	56.2	59.2	62.2	65.2	68.2	71.2	74.2	77.2	80.2	83.2	86.2
14	31.1	34.2	37.3	40.4	43.5	46.6	49.7	52.8	56.0	59.1	62.2	65.3	68.4	71.5	74.6	77.7	80.8	84.0	87.1	90.2
15	33.0	36.2	39.4	42.6	45.8	49.1	52.3	55.5	58.7	62.0	65.2	68.4	71.6	74.8	78.1	81.3	84.5	87.7	91.0	94.2
16	34.8	38.2	41.5	44.8	48.2	51.5	54.8	58.2	61.5	64.8	68.2	71.5	74.8	78.2	81.5	84.8	88.2	91.5	94.8	98.2
17	36.7	40.2	43.6	47.1	50.5	54.0	57.4	60.8	64.3	67.7	71.2	74.6	78.1	81.5	85.5	88.4	91.8	95.3	98.7	102.2
18	38.6	42.2	45.7	49.3	52.8	56.4	60.0	63.5	67.1	70.6	74.2	77.7	81.3	84.8	88.4	92.0	95.5	99.1	102.6	106.2
19	40.5	44.2	47.8	51.5	55.2	58.8	62.5	66.2	69.8	73.5	77.2	80.8	84.5	88.2	91.8	95.5	99.2	102.8	106.5	110.2
20	42.4	46.2	50.0	53.7	57.5	61.3	65.1	68.8	72.6	76.4	80.2	84.0	87.7	91.5	95.3	99.1	102.8	106.6	110.4	114.0

Side Walls and includes Ceilings.

Directions to Use Table :—EXAMPLE.—Say room 19ft. x 13ft. x 7ft. high to ceiling or plate rail. Take 19 in 7ft. high table) and follow along 13 line to junction, read 77.2 sq. yds., viz., total number of square yards on walls without openings deducted, together with a 19ft. x 13ft. ceiling. Multiply together = 247 ÷ 9 = 27.4, which deduct from 77.2 = 49.8 sq. yards for walls alone.

Square Yards and Feet of walls in Rooms 8-feet high including Sq. Yards in Ceilings.

Size in feet	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
3	11.6	13.7	15.8	18.0	20.1	22.2	24.3	26.4	28.5	30.6	32.7	34.8	37.0	39.1	41.2	43.3	45.4	47.4	49.6	51.7
4	13.7	16.0	18.2	20.4	22.6	24.8	27.1	29.3	31.5	33.7	36.0	38.2	40.4	42.6	44.8	47.1	49.3	51.5	53.7	56.0
5	15.8	18.2	20.5	22.8	25.2	27.5	29.8	32.2	34.5	36.8	39.2	41.5	43.8	46.2	48.5	50.8	53.2	55.5	57.8	60.2
6	18.0	20.4	22.8	25.3	27.7	30.2	32.6	35.1	37.5	40.0	42.4	44.8	47.3	49.7	52.2	54.6	57.1	59.5	62.0	64.4
7	20.1	22.6	25.2	27.7	30.3	32.8	35.4	38.0	40.5	43.1	45.6	48.2	50.7	53.3	55.8	58.4	61.0	63.5	66.1	68.9
8	22.2	24.8	27.5	30.2	32.8	35.5	38.2	40.8	43.5	46.2	48.8	51.5	54.2	56.8	59.5	62.2	64.8	67.5	70.2	72.8
9	24.3	27.1	29.8	32.6	35.4	38.2	41.0	43.7	46.5	49.3	52.1	54.8	57.6	60.4	63.2	66.0	68.7	71.5	74.3	77.1
10	26.4	29.3	32.2	35.1	38.0	40.8	43.7	46.6	49.5	52.4	55.3	58.2	61.1	64.0	66.8	69.7	72.6	75.5	78.4	81.3
11	28.5	31.5	34.5	37.5	40.5	43.5	46.5	49.5	52.5	55.5	58.5	61.5	64.5	67.5	70.5	73.5	76.5	79.5	82.5	85.5
12	30.6	33.7	36.8	40.0	43.1	46.2	49.3	52.4	55.5	58.6	61.7	64.8	68.0	71.1	74.2	77.3	80.4	83.5	86.6	89.7
13	32.7	36.0	39.2	42.4	45.6	48.8	52.1	55.3	58.5	61.7	65.0	68.2	71.4	73.6	77.8	81.1	84.3	87.5	90.7	94.0
14	34.8	38.2	41.5	44.8	48.2	51.5	54.8	58.2	61.5	64.8	68.2	71.5	74.8	78.2	81.5	84.8	88.2	91.5	94.8	98.2
15	37.0	40.4	43.8	47.3	50.7	54.2	57.6	61.1	64.5	68.0	71.4	74.8	78.3	81.7	85.2	88.6	92.1	95.5	99.0	102.4
16	39.1	42.6	46.2	49.7	53.3	56.8	60.4	64.0	67.5	71.1	74.6	78.2	81.7	85.3	88.8	92.4	96.0	99.5	103.1	106.6
17	41.2	44.8	48.5	52.5	55.8	59.5	63.2	66.8	70.5	74.2	77.8	81.5	85.2	88.8	92.5	96.2	99.8	103.5	107.2	110.8
18	43.3	47.1	50.8	54.6	58.4	62.2	66.0	69.7	73.5	77.3	81.1	84.8	88.6	92.4	96.2	100.0	103.7	107.5	111.3	115.1
19	45.4	49.3	53.2	57.1	61.0	64.8	68.7	72.6	76.5	80.4	84.3	88.2	92.1	96.0	99.8	103.7	107.6	111.5	115.4	119.3
20	47.5	51.5	55.5	59.5	63.5	67.5	71.5	75.5	79.5	83.5	87.5	91.5	95.5	99.5	103.5	107.5	111.5	115.4	119.5	123.5
21	49.6	53.7	57.8	62.0	66.1	70.2	74.3	78.4	82.5	86.6	90.7	94.8	99.0	103.1	107.2	111.3	115.4	119.5	123.6	127.7
22	51.7	56.0	60.2	64.4	68.8	72.8	77.1	81.3	85.5	89.7	94.0	98.2	102.4	106.6	110.8	115.1	119.3	123.5	127.7	132.0
23	53.8	58.2	62.5	66.8	71.2	75.5	79.8	84.2	88.5	92.8	97.2	101.5	105.8	110.2	114.5	118.8	123.2	127.5	131.8	136.2
24	56.0	60.4	64.8	69.3	73.7	78.2	82.6	87.1	91.5	96.0	100.4	104.8	109.3	113.7	118.2	122.6	127.1	131.5	136.0	140.4

Multiply or Deduct Area of Ceilings if Walls only are required.

Sizes and Square Yards and Feet of Walls in Rooms 9-feet high, including Ceilings.

Size	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
3.....	13.0	15.3	17.6	20.0	22.3	24.6	27.0	29.3	31.6	34.0	36.3	38.6	41.0	43.3	45.6	48.0	50.3	52.6	55.0	57.3
4.....	15.3	17.7	20.2	22.6	25.1	27.5	30.0	32.4	34.8	37.3	39.7	42.2	44.6	47.1	49.5	52.0	54.4	56.8	59.3	61.7
5.....	17.6	20.2	22.7	25.3	27.8	30.4	33.0	35.5	38.1	40.6	43.2	45.7	48.3	50.8	53.4	56.0	58.5	61.1	63.6	66.2
6.....	20.0	22.6	25.3	28.0	30.6	33.3	36.0	38.6	41.3	44.0	46.6	49.3	52.0	54.6	57.3	60.0	63.5	65.4	68.0	70.6
7.....	22.3	25.1	27.8	30.6	33.4	36.2	39.0	41.7	44.5	47.3	50.1	52.8	55.6	58.4	61.2	64.0	66.7	69.5	72.3	75.5
8.....	24.6	27.5	30.4	33.3	36.2	39.1	42.0	44.8	47.7	50.6	53.5	56.4	59.3	62.2	65.1	68.0	70.8	73.7	77.6	79.1
9.....	27.0	30.0	33.0	36.0	39.0	42.0	45.0	48.0	51.0	54.0	57.0	60.0	63.0	66.0	69.0	72.0	75.0	78.0	81.0	84.0
10.....	29.3	32.4	35.5	38.6	41.7	44.8	48.0	52.0	54.2	57.3	60.4	63.5	66.6	69.7	72.8	76.0	79.1	82.2	85.3	88.4
11.....	31.6	34.8	38.1	41.3	44.5	47.7	51.0	54.2	57.4	60.6	63.8	67.1	70.3	73.5	76.7	80.0	83.2	86.4	89.6	92.8
12.....	34.0	37.3	40.6	44.0	47.3	50.6	54.0	57.3	60.6	64.0	67.3	70.6	74.0	77.3	80.6	84.0	87.3	90.6	94.0	97.3
13.....	36.3	39.7	43.2	46.6	50.1	53.5	57.0	60.4	63.8	67.3	70.7	74.2	77.6	81.1	84.5	88.0	91.4	94.8	98.3	101.7
14.....	38.6	42.2	45.7	49.3	52.8	56.4	60.0	63.5	67.1	70.6	74.2	77.7	81.3	84.8	88.4	92.0	95.5	99.1	102.6	106.2
15.....	41.0	44.6	48.3	52.0	55.6	59.3	63.3	66.6	70.3	74.0	77.6	81.3	85.0	88.6	92.3	96.0	99.6	103.3	107.0	111.6
16.....	43.3	47.1	50.8	54.6	58.4	62.2	66.0	69.7	73.5	77.3	81.1	84.8	88.6	92.4	96.2	100.0	103.7	107.5	111.3	115.1
17.....	45.6	49.5	53.4	57.3	61.2	65.1	69.0	72.8	76.7	80.6	84.5	88.4	92.3	96.2	100.4	104.0	107.8	111.7	115.6	119.5
18.....	48.0	52.0	56.0	60.0	64.0	68.0	72.0	76.0	80.0	84.0	88.0	92.0	96.0	100.0	104.0	108.0	112.0	116.0	120.0	124.0
19.....	50.3	54.4	58.5	62.6	66.7	70.8	75.0	79.1	83.2	87.3	91.4	95.5	99.6	103.7	107.8	112.0	116.1	120.2	124.3	128.4
20.....	52.6	58.6	61.1	65.3	69.5	73.7	78.0	82.2	86.4	90.6	94.8	99.1	103.3	107.5	111.7	116.0	120.2	124.4	128.6	132.8
21.....	55.0	59.3	63.6	68.0	72.3	76.6	81.0	85.3	89.6	94.0	98.3	102.6	107.0	111.3	115.6	120.0	124.3	128.6	134.3	137.3
22.....	57.3	61.7	66.2	70.6	75.1	79.5	84.0	88.4	92.8	97.3	101.7	106.2	111.6	115.1	121.5	124.0	128.4	132.8	137.3	141.7
23.....	59.6	64.2	68.7	73.3	77.8	82.4	87.0	91.5	95.1	100.6	105.2	109.7	114.3	118.8	123.4	128.0	132.5	137.0	141.6	146.2
24.....	62.0	66.6	71.3	76.0	80.6	85.3	90.0	94.6	99.3	104.0	108.6	113.3	118.0	122.6	127.3	132.0	136.6	143.1	146.0	150.6

If Ceilings not required, multiply sizes and Deduct.

Square Yards and Feet of Walls in Rooms 10-feet high, including Ceilings.

Size	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
3...	14.3	16.8	19.4	22.0	24.5	27.1	29.6	32.2	34.7	37.3	39.8	42.4	45.0	47.5	50.1	52.6	55.2	57.7	60.3	62.8
4...	16.8	19.5	22.2	24.8	27.5	30.2	32.8	35.5	38.2	40.8	43.5	46.2	48.8	51.5	54.2	56.8	59.5	62.2	64.8	67.5
5...	19.4	22.2	25.0	27.7	30.5	33.3	36.1	38.8	41.6	44.4	47.2	50.0	52.7	55.5	58.3	61.1	63.8	66.6	69.4	72.2
6...	22.0	24.8	27.7	30.6	33.5	36.4	39.3	42.2	45.1	48.0	50.8	53.7	56.6	59.5	62.4	65.3	68.2	71.1	74.0	76.8
7...	24.5	27.5	30.5	33.5	36.5	39.5	42.5	45.5	48.5	51.5	54.5	57.5	60.5	63.5	66.5	69.5	72.5	75.5	78.5	81.5
8...	27.1	30.2	33.3	36.4	39.5	42.6	45.7	48.8	52.0	55.1	58.2	61.3	64.4	67.5	70.6	73.7	76.8	80.0	83.1	86.2
9...	29.6	32.8	36.1	39.3	42.5	45.7	49.0	52.2	55.4	58.6	61.8	65.1	68.3	71.5	74.7	78.0	81.2	84.4	87.6	90.8
10...	32.3	35.5	38.8	42.2	45.5	48.8	52.2	55.5	58.8	62.2	65.5	68.8	72.2	75.5	78.8	82.2	85.5	88.8	92.2	95.5
11...	34.7	38.2	41.6	45.1	48.5	52.0	55.4	58.8	62.3	65.7	69.2	72.6	76.1	79.5	83.0	86.4	89.8	93.3	96.7	100.2
12...	37.3	40.8	44.4	48.0	51.5	55.1	58.6	62.2	65.7	69.3	72.8	76.4	80.0	83.5	87.1	90.6	94.2	97.7	101.3	104.8
13...	39.8	43.5	47.2	50.8	54.5	58.2	61.8	65.5	69.2	72.8	76.5	80.2	83.8	87.5	91.2	94.8	98.5	102.2	105.8	109.5
14...	42.4	46.2	50.0	53.7	57.5	61.3	65.1	68.8	72.6	76.4	80.2	84.0	87.7	91.5	95.3	99.1	102.8	106.6	110.4	114.2
15...	45.0	48.8	52.7	56.6	60.5	64.4	68.3	72.2	76.1	80.0	83.8	87.7	91.6	95.5	99.4	103.3	107.2	111.1	115.0	118.8
16...	47.5	51.5	55.5	59.5	63.5	67.5	71.5	75.5	79.5	83.5	87.5	91.5	95.5	99.5	103.5	107.5	111.5	115.5	119.5	123.5
17...	50.1	54.2	58.3	62.4	66.5	70.6	74.7	78.8	83.0	87.1	91.2	95.3	99.4	103.5	107.6	111.7	115.8	120.0	124.1	128.2
18...	52.6	56.8	61.1	65.3	69.5	73.7	78.0	82.2	86.4	90.6	94.8	99.1	103.3	107.5	111.7	116.0	120.2	124.4	128.6	132.8
19...	55.2	59.5	63.8	68.2	72.5	76.8	81.2	85.5	89.8	94.2	98.5	102.8	107.2	111.5	115.8	120.2	124.5	128.8	133.2	137.5
20...	57.7	62.2	66.6	71.1	75.5	80.0	84.4	88.8	93.3	97.7	102.2	106.6	111.1	115.5	120.0	124.4	128.8	133.3	137.7	142.2
21...	60.3	64.8	69.4	74.0	78.5	83.1	87.6	92.2	96.7	101.3	105.8	110.4	115.0	119.5	124.1	128.6	133.2	137.7	142.3	146.8
22...	62.8	67.5	72.2	76.8	81.5	86.2	90.8	95.5	100.2	104.8	109.5	114.2	118.8	123.5	128.2	132.8	137.5	142.2	146.8	151.5
23...	65.4	70.2	75.0	79.7	84.5	89.3	94.1	98.8	103.6	108.4	113.2	118.0	122.7	127.5	132.3	137.1	141.8	146.6	151.4	156.2
24...	68.0	72.8	77.7	82.6	87.5	92.4	97.3	102.2	107.1	112.1	114.8	121.8	126.7	131.5	136.4	141.3	146.2	151.1	156.0	160.8

Square Yards and Feet of Walls in Rooms 11-feet high, including Ceilings.

Size	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
3...	15.6	18.4	21.2	24.0	26.7	29.5	32.3	35.1	37.8	40.6	43.4	46.2	49.0	51.7	54.5	57.3	60.1	62.8	65.5	68.4
4...	18.4	21.3	24.2	27.1	30.0	32.8	35.7	38.6	41.5	44.4	47.3	50.2	53.1	56.0	58.8	61.7	64.6	67.5	70.4	73.6
5...	21.2	24.2	27.2	30.2	33.2	36.2	39.2	42.2	45.2	48.2	51.2	54.2	57.2	60.2	63.2	66.2	69.2	72.2	75.2	78.2
6...	24.0	27.1	30.2	33.3	36.4	39.5	42.6	45.7	48.8	52.0	55.1	58.2	61.3	64.4	67.5	70.6	73.7	76.8	80.0	83.1
7...	26.7	30.0	33.2	36.4	39.6	42.8	46.1	49.3	52.5	55.7	59.0	62.2	65.4	68.6	71.8	75.1	78.3	81.5	84.7	88.0
8...	29.5	32.8	36.2	39.5	42.8	46.2	49.5	52.8	56.2	59.5	62.8	66.2	69.5	72.8	76.2	79.5	82.8	86.2	89.5	92.8
9...	32.3	35.7	39.2	42.6	46.1	49.5	53.0	56.4	59.8	63.3	66.7	70.2	73.6	77.1	80.5	84.0	87.4	90.8	94.3	96.7
10...	35.1	38.6	42.2	45.7	49.3	52.8	56.4	60.0	63.5	67.1	70.6	74.2	77.7	81.3	84.8	88.4	92.0	95.5	99.1	102.6
11...	37.8	41.5	45.2	48.8	52.5	56.2	59.8	63.5	67.2	70.8	74.5	78.2	81.8	85.5	89.2	92.8	96.5	100.2	103.8	107.5
12...	40.6	44.4	48.2	52.0	55.7	59.5	63.3	67.1	70.8	74.6	78.4	82.2	86.0	89.7	93.5	97.3	101.1	104.8	118.6	112.3
13...	43.4	47.3	51.2	55.1	59.0	62.8	66.7	70.6	74.5	78.4	82.3	86.2	90.1	94.0	97.8	101.7	105.6	109.5	113.4	117.4
14...	46.2	50.2	54.2	58.2	62.2	66.2	70.2	74.2	78.2	82.2	86.2	90.2	94.2	98.2	102.2	106.2	110.2	114.2	118.2	122.2
15...	49.0	53.1	57.2	61.3	65.4	69.5	73.6	77.7	81.8	86.0	90.1	94.2	98.3	102.4	106.5	110.6	114.7	118.8	123.0	127.1
16...	51.7	56.0	60.2	64.4	68.6	72.8	77.1	81.3	85.5	89.7	94.0	98.2	102.4	106.6	110.8	115.1	119.3	123.5	127.7	132.0
17...	54.5	58.8	63.2	67.5	71.8	76.2	80.5	84.8	89.2	93.5	97.8	102.2	106.5	110.8	115.2	119.5	123.8	128.2	132.5	136.8
18...	57.3	61.7	66.2	70.6	75.1	79.5	84.0	88.4	92.8	97.3	101.7	106.2	110.6	115.1	119.5	124.0	128.4	132.8	137.3	141.7
19...	60.1	64.6	69.2	73.7	78.3	82.8	87.4	92.0	96.5	101.1	105.6	110.2	114.7	119.3	123.8	128.4	133.0	137.5	142.1	146.6
20...	62.8	67.5	72.2	76.8	81.5	86.2	90.8	95.5	100.2	104.8	10.95	114.2	118.8	123.5	128.2	132.8	137.5	142.2	146.8	151.5
21...	65.6	70.4	75.2	80.0	84.7	89.5	94.3	99.1	103.8	108.6	113.4	118.2	123.0	127.7	132.5	137.3	142.1	146.8	151.6	156.4
22...	68.4	73.3	78.2	83.1	88.0	92.8	97.7	102.6	107.5	112.4	117.3	122.2	127.1	132.0	136.8	141.7	146.6	151.5	156.4	161.3

Deduct size of Ceilings if not required.

Halls and Passages.—If *Through* are taken, deduct twice width by height.

Divide by 9 for yards, and deduct from table.

If *walls* alone are required, multiply the length and breadth of wall taken, divide by 9 for yards, and deduct from table.

Square Yards and Feet of Walls in Rooms 12-feet high, including Ceilings.

Size	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
3	17.0	20.0	23.0	26.0	29.0	32.0	35.0	38.0	41.0	44.0	47.0	50.0	53.0	56.0	59.0	62.0	65.0	68.0	71.0	74.0
4	20.0	23.1	26.2	29.3	32.4	35.5	38.6	41.7	44.8	48.0	51.1	54.2	57.3	60.4	63.5	66.6	69.7	72.8	76.0	79.1
5	23.0	26.2	29.4	32.6	35.8	39.1	42.3	45.5	48.7	52.0	55.2	58.4	61.6	64.8	68.1	71.3	74.5	77.7	81.0	84.2
6	26.0	29.3	32.6	36.0	39.3	42.6	46.0	49.3	52.6	56.0	59.3	62.6	66.0	69.3	72.6	76.0	79.3	82.6	86.0	89.3
7	29.0	32.4	35.8	39.3	42.7	46.2	49.6	53.1	56.5	60.0	63.4	66.8	70.3	73.7	77.2	80.6	84.4	87.5	91.0	94.4
8	32.0	35.5	39.1	42.6	46.2	49.7	53.3	56.8	60.4	64.0	67.5	71.1	74.6	78.2	81.7	85.3	88.8	92.4	96.0	99.5
9	35.0	38.6	42.3	46.0	49.0	53.3	57.0	60.6	64.3	68.0	71.6	75.3	79.0	82.6	86.3	90.0	93.6	97.3	101.0	104.6
10	38.0	41.7	45.5	49.3	53.0	56.8	60.6	64.4	68.2	72.0	75.7	79.5	83.3	87.1	90.8	94.6	98.4	102.2	106.0	109.7
11	41.0	44.8	48.7	52.6	56.5	60.4	64.3	68.2	72.1	76.0	79.8	83.7	87.6	91.5	95.4	99.3	103.2	107.1	111.0	114.8
12	44.0	48.0	52.0	56.0	60.0	64.0	68.0	72.0	76.0	80.0	84.0	88.0	92.0	96.0	100.0	104.0	108.0	112.0	116.0	120.0
13	47.0	51.1	55.2	59.3	63.4	67.5	71.6	75.7	79.8	84.0	88.1	92.2	96.3	100.4	104.5	108.6	112.7	116.8	121.0	125.1
14	50.0	54.2	58.4	62.6	66.8	71.1	75.3	79.5	83.7	88.0	92.2	96.4	100.6	104.8	109.1	113.3	117.5	112.7	126.0	130.2
15	53.0	57.3	61.6	66.0	70.3	74.6	79.0	83.3	87.6	92.0	96.3	100.6	105.0	109.3	113.6	118.0	122.3	126.6	131.0	135.3
16	56.0	60.4	64.8	69.3	73.7	78.2	82.6	87.1	91.5	96.0	100.4	104.8	109.3	113.7	118.2	122.6	127.1	131.5	136.0	140.4
17	59.0	63.5	68.1	72.6	77.2	81.7	86.3	90.8	95.4	100.0	104.5	109.1	113.6	118.2	122.7	127.3	131.8	136.4	141.0	145.5
18	62.0	66.6	71.3	76.0	80.6	85.3	90.0	94.6	99.3	104.0	108.6	113.3	118.0	122.6	127.3	132.0	136.6	141.3	146.0	150.6
19	65.0	69.7	74.5	79.3	84.1	88.8	93.6	98.4	103.2	108.0	112.7	117.5	122.3	127.1	131.8	136.6	141.4	146.2	151.0	155.7
20	68.0	72.8	77.7	82.6	87.5	92.4	97.3	102.2	107.1	112.0	116.8	121.7	126.6	131.5	136.4	141.3	146.2	151.1	156.0	160.8
21	71.0	76.0	81.0	86.0	91.0	96.0	101.0	106.0	111.0	116.0	121.0	126.0	131.0	146.0	141.0	146.0	151.0	156.0	161.0	166.0
22	74.0	79.1	84.2	89.3	94.4	99.5	104.6	109.7	114.8	120.0	125.1	130.2	135.3	140.4	145.5	150.6	155.7	160.8	166.0	171.1

PAPER HANGER

This trade has been almost revolutionized in recent years ; the old tawdry, staring papers have given place to productions that are thoroughly artistic in designs and improvement in the material employed.

A piece of paper is 36 feet long by 21 inches wide, and contains 63 sup. feet, or 7 sup. yards, but the ends are generally injured by packing, exposure, unrolling, &c. ; in papering there is also a further waste in matching the ends according to the size of the pattern ; an allowance must therefore be made from 5 to 9 super feet, in calculating the number of pieces required for a given area, after deducting the openings. Any portion of a piece required is charged as a whole piece.

TABLE FOR MEASURING ROOMS FOR PAPER.

Measure Round the Walls in Feet. Including Doors, Windows, &c., and not exceeding these measures.

Height in Feet.	20	24	28	32	36	40	44	48	52	56	60	64	68	72
7½ and under 8	3	3	4	4	5	5	6	6	7	8	8	9	9	10
8 ,, 8½	3	3	4	5	5	6	6	7	7	8	8	9	9	10
8½ ,, 9	3	4	4	5	5	6	7	7	8	8	9	9	10	11
9 ,, 9½	3	4	4	5	6	6	7	7	8	9	9	10	10	12
9½ ,, 10	3	4	5	5	6	7	7	8	9	9	10	10	11	12
10 ,, 10½	4	4	5	5	6	7	8	8	9	10	10	11	12	13
10½ ,, 11	4	4	5	6	7	7	8	9	9	10	11	11	12	13
11 ,, 11½	4	5	5	6	7	8	8	9	10	11	11	12	13	14
11½ ,, 12	4	5	6	6	7	8	8	9	10	11	12	12	13	14
12 ,, 12½	4	5	6	7	7	8	9	9	10	11	12	13	14	15
12½ , 13	4	5	6	7	8	8	9	10	11	12	13	14	14	15
13 ,, 13½	5	5	6	7	8	9	10	11	11	12	13	14	15	16
13½ ,, 14	5	5	6	7	8	9	10	11	12	13	14	14	15	16
14 ,, 14½	5	6	7	8	9	9	10	11	12	13	14	15	16	17
14½ ,, 15	5	6	7	8	9	10	11	12	13	14	14	15	16	17

Rule.—Find the height of the room between the skirting and cornice in the left hand column, and the nearest Figures to the measures round the Walls on the top line ; the figures where the two lines would cross or meet will show the number of pieces a room will take.

To find the quantity of Paper required for Ceilings, multiply the length and breadth in feet together, and divide by 50.

Wages of Paperhanger, 2/6 per hour. For Special Work, 2/8 per hour.

Wall Papers. British Wall Papers, variety of high-class hand and machine printed decorations. Plain and Figured Satins, Plain Oatmeals, Burlaps, Floral Tapestry effects, Imitation Glass Cloths, Imitation Leathers. Price per roll, from 2/6 ; 3/6 hand-made. Labor, hanging per roll, from 2/6 per roll ; hand made, 2/9 to 10/– per roll high quality and special work.

Light and Dark Pulps, in Floral, Geometrical, and other designs. In variety of colours and patterns. Specially suited for bedrooms. Price per roll, from 8d. Labour, ordinary, 2/– per roll.

Wall Paper, for Shops, Halls, Passages, Staircases, etc., in imitation of Sienna and other Marbles, Tiles, etc., as well as Oak, Maple, and wood of various kinds. Price per roll, from 3/6. Labor, from 2/6 per roll.

Wall Paper Friezes, to match the Papers. Supplied in widths 10½in. and 21in.

Floral Borders, for Wall Papers. Widths, 2, 3, 4, 5, and 7ins. Prices, 1d., 1½d., 2d., 3d., 4d. yard.

Panelling Borders. Widths, 1, 2, 3, 4, 5, and 7ins. Prices, 2d., 4d., 6d., 7d., 10½d., 1/– yd.

Cut-out Borders and Friezes. Widths, 2, 3, 4, 5, 7, and 10½ins. Prices, 3d., 4d., 5d., 6d., 7d., 1/– yd. Labor, hanging, from 3d. to 6d. per yd.

Sanitary Wall Paper, being stained, or printed in Oil, is less likely to absorb injurious particles. It can be washed with warm water when soiled. Price per roll, from 1/3. Labour, hanging, from 1/9 per roll.

Labor, Ceiling Papers, 20 per cent. or 6d. per roll extra.

Labor, at 2/6 hour, per square yard only.

	From s. d.	To s. d.
Straining canvas including tacks and slipping sq. yds.	1 6	2 3
Hanging lining paper ... ... per roll	1 0	2 0
Ditto common or satin paper ... ... ,,	1 0	2 0
Ditto flock	1 0	3 0
Pumicing lining paper	0 4	0 6
Hanging borders, per doz. yards	1 6	2 6
Plain crepes	2 0	3 0
Sizing, 2 coats, and varnishing paper	3 0	4 0
Ditto. do. and twice varnishing	3 6	5 0
Extras.		
Hanging horizontal papers	4 0	6 0
Hanging ingrain borders, 12in. to 18in., per yard ...	0 4	
Ditto, "Lignomur," "Anaglypta," &c., per panel	1 0	3 6

For superior decorations no prices can be quoted, since the cost of hanging entirely depends on the design and the number, size, and shape of the panels.

Ridgeley's "Ideal" **Trimmer,** for common or special papers This cutter trims "Anaglypta," and other raised material. Price for outfit, complete :—6ft., 32/–; 7ft., 35/–; 8ft., 37/–; 9ft., 40/–.

PASTES.

Paste for Papering Painted Work.

Mix the flour and water thinner; to each gallon add 1oz. resin. For Sanatile or stiff paper add glue or size.

Labelling Paste for Tin.

Mix stiff paste of flour and water, 1 gal.; add 2oz. tartaric acid, 1 pint treacle and boil stiff.

Paste for Paper to Iron or Metal.

Boil dextrine and water to consistency of very thin glue. Remove all traces of grease or oil with limewash previously.

PARTITIONS

	Per foot super.	
	Materials only s. d.	Labour only s. d.
1″ T. & G. Oregon Partition vert. boards 4″ x 1″ with centre ledge, torus md, 2″ x 2″ both sides next to ceiling. Secured at foot with 6″ skirting both sides. (*See Example below*)	8¼	3
1½″ Panelled Partition—single moulded ...	1 0	2 0
Ditto. Moulded both sides	1 0	2 2
2″ square-framed partition, in 4′ x 18″ panels ...	1 3	2 2
Ditto. Moulded and square panels	1 3	2 4
Ditto. Moulded both sides	1 3	2 6
Smaller panels extra to framing	1 5	2 8

EXAMPLE.

One square of partition per first item reckoned out.

	£ s. d.
100 feet T. & G. dd. and bd. 4″ x 1″, centre ledge rail, 60/–	3 0 0
20 feet 6″ skirting—bottom. 31/6 100 lineal	6 3
10 feet beaded 4″ x 1″ centre ledge rail	2 9
	£3 9 0
Labour	1 5 0
100 sq. ft. Material @ 8¼d. sq. ft.	Total ... £4 14 0
,, ,, ,, Labour and nails 3d. sq. ft.	per square.
= 11¼d. sq. ft.	

OREGON STUDDING FOR PARTITIONS.

Per Square.

(38/– per 100 feet super).

	£ s. d.
3″ x 2″ studs, 2 ft. apart, with top and bottom plates = 80 ft. 3″ x 2″ studs and plates @ 3d.	1 0 0
60 ft. 2″ x 1″ Oregon Battens @ 7/– 100 lineal	4 3
Labour and nails per square	11 9
	£1 16 0

Oregon STUDDING for Partitions.

		per sq.
Spaced (starting with one) per 100 s. ft.		
18in. apart, 7/10 = 70 l. ft. at 20/– = ...	14/–	
Add labour	6/6	
	20/6	20/6
2 feet, apart = 60 l. ft. at 20/– = ...	12/–	
Labour	6/–	
	18/–	18/–
3 feet, apart = 45 l. ft. at 20/–	9/–	
Labour	5/6	
	14/6	14/6
4 feet apart = 35 l. ft. at 20/–...	7/–	
Labour	5/–	
	12/–	12/–

Add top and bottom plates if any and braces.

Partitions.

3 feet Fibro cement sheets, one side only, add.
Oregon 3 ply $\frac{3}{16}$″ best quality, 30/– per square.
Pacific Maple, $\frac{3}{16}$″ = 33/–. Queensland Maple, 45/–.
Ten-Tex $\frac{1}{4}$″ thick, 33/–, $\frac{1}{2}$″ thick, 37/–.
See Carpenters Section for Plywoods and Studding.

Compressed Fibre Boards are made different thicknesses with trade names, " **Celotex,**" " **Sisalkraft,**" " **Canec,**" " **Donna Conna,**" " **Upson,**" " **Masonite,**" etc.

See advt. pages 14, 27.

" **Celotex** " Wood fibre for plaster ceilings, cost per s. yd., 2/6.
" **Insulwood,**" made of wood fibres., 10/– per s. yd.
Clarkson Adelaide.

PARTITION Boardings.

S/K 9-ply Wallboard, made 3ft. and 4ft. wide x 6ft. to 8ft. long, 13/6, per 100 s. ft.

This board is strongly reinforced by compressed fibre and may be painted, kalsomined or papered **for internal walls and ceilings.** *See Agents Advt., page* 14.

Fibre Rock, $\frac{5}{8}$″ thick, for walls, ceilings, wood fibre petrified in cement (no Magnesite) fireproof can be used self supporting or cement rendered, plastered or sprayed for inside.

The placement of fibre tends to decoration and tinting, for outside to $1\frac{7}{8}$" thick, can be cemented to walls or nailed with gal. iron nails.

A cosmo-plastic cement partition = one square beaded in at sides, top and floor, cost £5.

When studding not used, **self supporting** material.

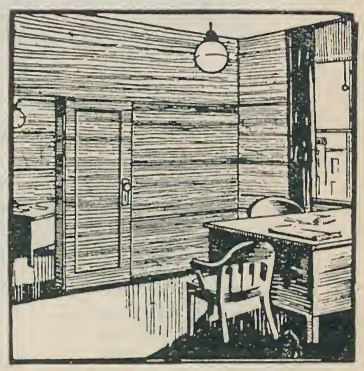
		s.	yd.	100 square
Material——				
$11\frac{1}{9}$ yards	Cosmoplastic boards interior $\frac{1}{8}$" thick, plain...	1/–		11.2
$11\frac{1}{9}$ yards	,, $\frac{7}{8}$" exterior, plain	1/9		19.6

DURAVENEER.

(Queensland Walnut or Maple)
An asbestos cement sheeting **veneered** with selected Queensland Walnut or Maple for panelling interior walls and partitions of office buildings, foyers, theatres, hallways, shops, sale rooms, show windows, banks, restaurants, homes, etc. Duraveneer combines the beauty of grained timber with the fire-resisting qualities of asbestos cement.

Sheets 2′ and 3′ wide, by 6′ long. The standard thickness is $\frac{9}{32}$" (approx.)

For further information and prices refer advt. pages 1 *and* 19.



DONNA CONNA BUILDING BOARDS.

For full description see under "Carpenter" also Agents Advt. page 27.

DURALITE HOLLOW BLOCKS.

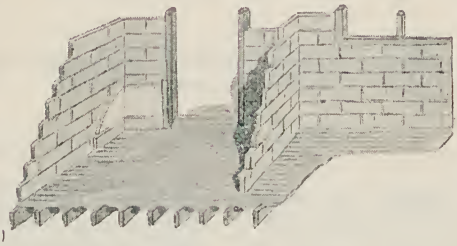
For Concrete Floors, Walls & Partitions, Etc.

("Duralite" Concrete Products Co.)

Duralite Walling Blocks are giving wonderful satisfaction in their extensive use in dividing and partition walls of offices, flats, etc., and permits the construction of a solid wall of light weight concrete on wooden floors and wide concrete spans.

Duralite Blocks are manufactured from SEASONED COKE BREEZE, machine pressed to a size which equals a face dimension of four ordinary bricks—about 18½in. x 6½in. and in thickness of 2in., 2½in., 3in., 4in. and 6in.—10 blocks to a square yard.

Fire, sound, heat and vermin resisting, and being light in weight are easily and quickly handled, and when built in cement mortar form a solid slab between walls. Claimed to be superior to terra cotta in building strength and has an excellent face for plaster.



18½ x 6½ & width 2″ to 6″
Wall and Partition Blocks

DURALITE WALLING BLOCKS.

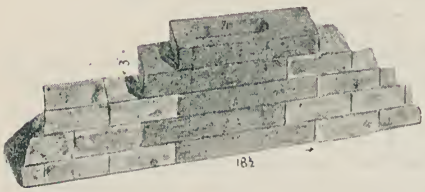
Size approx. 18½in. x 6½in.

Thickness	2in.	2½in.	3in.	4in.	6in.	
Approx. weight dry per yd.	80	100	120	160	240	lbs.
Approx. yards per ton ...	28	22	18	14	9	
Approx. tons per yard ...	.035	.045	.055	.07	.12	
Price delivered city "area" Ton lots	3/2	3/4	3/6	4/6	7/–	per yd.
Price delivered wharf or rail	3/4	3/6	3/8	4/8	7/2	,,

Suburban deliveries, price on application.

Flue-Vent Blocks for Gas Fire Fumes and Ventilation for 4½in. Walls

Price City Delivery 58/4 per 100.

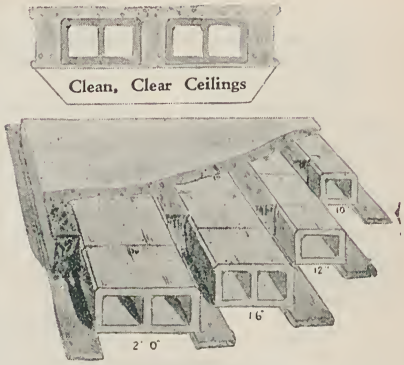


Block for Fume Flues, Vents and Pipe Ducts

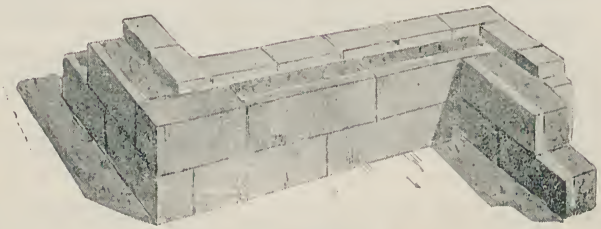
Duralite Vent blocks in sizes to construct with 4½in. ordinary brick walls to serve as flues of gas fire fumes, ventilation, air conditioning etc., ducts for pipes, or tubes for all purposes—

Flue about 8½in. x. 2¼in. will take 2in. stock down pipe.

Duralite Hollow Blocks for concrete floor construction are manufactured from selected coke breeze, to sizes to suit any floor design in either one or two way systems. These blocks give permanent level clean ceilings, without the necessity of using plaster slabs etc., and the simplicity of construction ensures a saving in cost and time. Successfully used in the Commonwealth Bank Building and elsewhere.



Hollow Blocks



Natural Stone Faced Blocks
Made to 4½″ Brick Widths

Duratile can be supplied with a veneer of natural stone, also blocks may be formed with nibs or recessed as required to special order. Further Particulars on Application. *See* Manufacturers Advt. p. 17A.

INSULITE.
THE ORIGINAL WOOD-FIBRE INSULATING BOARD
for Decorative Wall and Ceiling.

Duo surfaced—Burlap and Smooth. Sizes, 5, 6, 7, 8, 9, 10, 11, 12 and 14 feet long by 3 feet and 4 feet wide by half-inch thick, 34/– per 100 sq. feet.

Tests 1,152 lbs. tension strain.

Upson Fibre Tile, similar to the stamped tile imitation **Tilux** for bathrooms, Butchers' and fish shops.

Also made plain for ceilings.

FIBREROCK.

Fireproof insulation for **exterior** or **interior** walls or **Partitions.**

Wood fibre petrified in cement (no Magnesite)

Made in ½in., 1in., 2in., thick, 3/– per sq. yd. 1″ thick.

Per square 180lbs., 400lbs., 3in. thick, compressed with ½″ cement render on each side.

Tensile strength 240 = 500 lbs.

Price, 3/–, 4/6, 6/6 per square yard.

Unaffected by moisture, heat or rain or snow, can be fastened with gal. nails 1½″ longer than thickness. Can be easily cut with a saw or cemented to walls &c. 1in. fibrerock is said to be equal to 4½″ brickwork or concrete.

Weights approx.—

Per 100 s. feet, ½″, 1″, 2″
150lbs. 220lbs., 400lbs.

Instructions for Fix Fibrerock.

For **ceilings,** fix centre first to ceiling joists.

2″ Partition walls (**no** framing), lay strips of " exmet " or expanded metal across butt joints in cement when laid upon floor, and cement edges together, let dry 24 hours, then up END.

Compressed cork board 4″ thick, in layers of 2″, 3/1 per square yd.

Fibrerock is a perfect key for cement-render and plaster, A ¼″ coating of Fibrerock is as good as ½″ on brick. If sand is too coarse, or not " fat enough," add 10% hydrated lime.

Ten Test Ply-wood board ¼in. **thick,** 4 ft. wide, 6 ft. to 10 ft. long, 23/6 per 100 s. ft.

Sisalkraft a 6 ply fibre and bitumen water-proof fabric. Prices from 7/9 per 100 s. ft. for Building paper and 9 ply, 13/6 per 100, 18 ply, 28/6 per 100 s. ft.

For further information, see advt. page 14.

S-K 9-ply wall board ... ... 13/6 per 100 sq. ft.
Reinforced Air felt ... ... 12/6 ,, ,,

Duk-Bak brand building paper, 36″, 48″ wide Sisalkraft covering concrete, 2/– per 100 s. ft. or 3d. per sq. yd.

Wunderlich Standard Pressed Steel Partitions with opaque glass 4 feet high and steel panelling 3 feet base for intermediate light division wall. About £10 per square, double sided.

For further information, see advt. pages 1-19.

Cement Block Partition, sizes and weights of blocks, solid and hollow—

Solid, 30in. x 12in. x 2in. Weight, 10 lbs. per sq. foot.
Hollow, 30in. x 12in. x 3in. Weight, 9¾lbs. per sq. ft.
Partitions laid with cement and Victor Plaster, 3 sand, 1 plaster.
Hollow, 30in. x 12in. x 4in, 12¾lbs. ; 5in. base, 21lbs. ; 8in. base, 25lbs. per sq. foot.
Price, same as Terra Cotta blocks for laying. Cost, 2/3rds as much.

PLASTERER

MEASUREMENT.

In **Measuring Plastering** a variety of opinions exist, all of them tending more or less to misunderstanding, and consequent litigation.

The least objectionable method is to take the *net measurement* at a price calculated to meet the cost of the work under consideration, including all extras.

Walls and ceilings by the super yard.

Cornices and mouldings by the running foot, per inch girth. Ordinary openings with 4½in. reveals are not deducted as the extra work in reveals, is reckoned equal to opening.

The weathering of cornices to be taken as plain work.

Panels, mitres, returns, columns, caps and bases, balusters, dentil blocks, and patterns, &c., so much each, according to dimensions.

Narrow widths, dadoes, skirtings, &c., kept separate and reckoned by the lineal ft.

Rough cast, lined work, projecting quoins, basecourses, kept separate and reckoned accordingly.

Or priced extra on plain body work, according to the cost of extra labour.

If circular, add one-fourth, if circular circular as in domes or concentric arches, add one-half to each item.

Scaffolding to be charged extra, if erected expressly for the work.

In taking the height of walls for inside plastering measure down to *skirting grounds.*

If no grounds, then down to the floor, deducting all openings except for "labour only."

If more than mitres in one room they are reckoned in measuring cornices.

MEMORANDA.

Portland Cement Stucco should be rendered and set, or *roughed* in and finished in two coats; the second, or setting coat, can be added before the first coat dries, otherwise it must be scored deeply to form "key" for following coat. In every case the walls should be watered before the stucco is applied; it is also necessary, if the cement is to become hard throughout, or properly set, that it be saturated with water daily, from 3 to 14 days, according to the heat of the weather, until there is no more suction, otherwise the cement stucco or plaster will merely have a hard surface, while the bulk remains a dry powder. Really good cements are often badly treated.

Porosity.—All exposed flat surfaces, or weatherings, should be set in 1 to 1 cement, the addition of sand makes it porous in proportion to the quantity used.

Plasterers' Putty for finishing coat of plaster work is lime dissolved in water, screened through hair sieve into boxes, allowed to settle and sweeten 7 days.

Gauged Stuff is made by mixing before use 3 to 4 parts of the above Putty with 1 part of Plaster of Paris.

Trowelling the finishing surface should not be done too much as it causes fine cracks to appear when dry.

To prevent Plaster of Paris setting too quickly add sprinkled sugar or add acetic acid.

The tints used for the setting coats are generally French grey, drab, buff or salmon.

Special cold water paints, "Kalsomines," "Indeliblo," &c., of all tints, can be applied safely after 6 months' drying, when the mellowed plaster will not affect or alter the tint.

COVERING POWER OF PLASTER.

"**Floating**" or first body coat of plaster, for internal walls only. 1¼ bags of stone lime, 1 cubic yard of sand will cover 50 super yards ½in. thick, or about 70 yards including general openings of cottages, or 1 bag lime and 1 load Sydney sand will cover 40 square yards ¾in. thick, or 60 square yards ½in. thick.

1 bag of stone lime run into **Putty** will "set" or finish coat 50 super yards.

"**Pricking up**" **Stuff,** body coat for lathed ceilings, ¾in. thick—3 bags stone lime, 1 bag of cow's hair=about 2 bushels; mixed with 1 cubic yard sand will cover 100 square yards on Oregon sawn laths; or 1 bag lime ½ cubic yard sand, ½ bushel hair will do 30 square yards on scrim, or 35 yards on laths alone.

If on expanded metal lathing it will take 4 bags of lime to cover 100 super yards.

If *scrim* is used, 2½ bags of stone lime to the 100 yards.

One load sand mixed with ⅔ bag of lime will cover or "float" 40 square yards.

Shell lime slacked will pass through a 16 mesh sieve.

Stone lime, ditto, 30 mesh. A good mixture for "setting."

1 bag stone lime "putty" will cover 70 square yards of "setting" of interior walls.

Generally the mortar is reckoned at one-third stone lime and two-thirds clean sand, mixed with long ox hair—thickness, ¾in.

1 cubic yard contains 21 bushels.
1 bag cement (94 pounds) contains 1 cubic foot.
1 cask of cement contains 3½ cubic feet.
6 casks to the cubic yard.
7/9th cubic ft. = 1 bushel.

To make the position of Wooden Plugs show through plaster on wall, spray the wall with water by syringe or brush where dark spots will appear at positions of plug.

The Rawl Plug and Electric Hammer have superseded the old fashioned plug in joint.

See Agents Advt., page 4.

TABLE SHOWING QUANTITY OF MIXING WATER PER BAG OF CEMENT AND MATERIALS FOR ONE CUBIC YARD OF CONCRETE.

Based on use of Broken Stone One Inch and Under with Dust Screened Out.

QUANTITY OF MIXING WATER PER BAG OF CEMENT							MATERIALS FOR 1 CUBIC YARD OF CONCRETE				Quantity of Mixing Water per Cubic Yard Batch	
Approximate Mix			Imp. Galls. of Water per Paper Bag of Cement		Imp. Galls. of Water per Jute Bag of Cement		Bags of Cement in 1 Cub. Yd. of Concrete		Cu. Ft. of Sand or Fine Aggregate in 1 Cubic Yard of Concrete	Cu. Ft. of Coarse Material (Broken Stone in 1 Cu. Yd. of Concrete	Imp. Galls.	Imp. Galls.
Cement	Fine Aggregate (Sand)	Coarse Aggregate (Broken Stone or Gravel).	Min.	Max.	Min.	Max.	Paper Bags	Jute Bags			Min.	Max.
1	1½	3	4½	5	6	6¾	7⅜	5½	11⅜	22⅝	33⅛	36⅞
1	2	3	4¾	5¼	6⅜	6⅞	6¾	5⅛	14	20¾	32⅛	35½
1	2	3½	4⅞	5⅜	6½	7	6½	4⅞	12⅞	22⅛	31⅝	35
1	2	4	5	5½	6⅝	7⅛	5⅞	4⅜	11⅞	24	29⅜	32¼
1	2	5	5¾	6¼	7⅝	8¼	5	3⅞	10½	26¼	28¾	31¼
1	2½	3½	5	5½	6⅝	7⅜	6	4½	14	19¾	30	33
1	2½	4	5¼	5¾	7	7⅝	5⅜	4	14	22⅛	30⅞	34¾
1	2½	5	6	6½	8	8⅝	4¾	3⅝	12⅜	24½	28½	30⅞
1	3	4	5⅞	6⅜	7⅞	8½	5	3⅞	15⅝	20¾	29¼	31⅞
1	3	5	6¼	6¾	8¼	9	4½	3⅜	13¾	23	28⅛	30⅜
1	3	6	6⅞	7½	9⅛	9⅞	4	3	12⅜	24⅞	27½	29

NOTE.—In calculating the quantity of cement to be used, it is necessary to use the numerals under the columns marked "paper bags," or "jute bags," according to the type of bag in which the cement has been supplied.

For full information on the advantages and use of cement, refer to Advt., p. 28.

PLASTERERS' MATERIALS.

Subject to Fluctuation.

A 4 gal. kerosene tin equals half a bushel.	Sydney. £	s.	d.
Cement—Ton lots £5 ton. Truck loads 10 tons special rates.			
Portland Cement, in 94lb. bags, per bag		5	0
Keen's Cement, per cask, English imported	4	10	0
Stone Lime, per bag, 3 bushels	0	8	6
Shell Lime, per bag, 3 bushels	0	7	6
Plaster of Paris, per cask, 3½ bushels " Diamond " ...	2	2	0
Australian Plaster, " Victor," in bags, per cwt.	0	9	6
Hard finish plaster, "Victor "		13	6
Rock hard putty, 1lb., 2/6, bulk, per lb.	0	2	0
½lb. Carton, each	0	1	4
Sydney Sand, per load, 23 cubic ft., 7/6 to 9/–.			
Nepean River Coarse Sand, at railway, per ton	0	3	0
Hair, long cow's, 3 bushel bag	0	10	6
Frolime Hydrated Lime, 50lb. bag	0	2	6

WALLS AND CEILINGS.

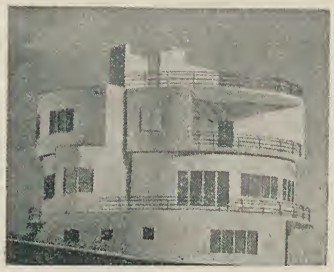
Rendering, Lathing, etc.

Wages, 1938 Award Rates, 44 hours, 2/9½ per hour.
Sewer Cement Plasterer, 1½ over the ordinary rate.

Per super yard.	Materials. s.	d.	Labour. s.	d.	Cost. s.	d.
Render or Plaster rough on walls	0	10	0	8	1	6
Ditto and set with fine stuff, 2 coats ...	1	2	1	4	2	6
Ditto, float, and set with tinted fine stuff (3 coats trowelled)	1	6	1	4	2	10
Lathing only, Oregon laths to partitions ...	1	3	0	5	1	8
,, and plaster, or lay one coat, do. ...	1	2	1	2	2	4
,, lay and set two coats do. ...	2	0	2	6	4	6
,, Expanded patent steel lathing partitions, floated	2	4	1	8	4	0
Expanded steel laths, lay, float and set to ceilings	2	4	1	10	4	2
If set with gauged putty, add	0	4	0	2	0	6
,, with plaster of Paris, add	0	6	0	4	0	10

CORNICES, ETC., IN PLASTER OF PARIS.

Per foot run.	Materials. s.	d.	Labour. s.	d.	Total. s.	d.
Plain impost or other mouldings, 4in. girt ...	0	4	0	6	0	10
Ditto, from 8in girt	0	9	0	8	1	5
Ditto, from 12in. girt	1	0	1	0	2	0
Cornices, with soffit and frieze, the whole girt to be taken at per foot super	1	0	1	0	2	0



PORTLAND CEMENT STUCCO.

Per yard super.	Materials. s.	d.	Labour. s.	d.	Total. s.	d.
Rough render, in cement	1	6	1	3	2	9
Plain face, on brick or stone, jointed... ...	1	6	1	6	3	0
Rough cast, Bluestone, on ½in. stucco ...	1	6	1	6	3	0
Cornices as before, per sup. ft.	0	8	1	4	2	0
Large skirting, per super ft.	0	8	1	0	1	8
Plain facia, frieze or pilasters, per super ft. ...	0	8	1	0	1	8

Astragals, ovolos, O.G.'s, and other mouldings. grooves or sinkings, under 4in. girt,

	Materials.		Labour.		Total.	
per ft. run	0	2	0	4½		6½
Ditto, from 4 to 8in. per ft. run	0	3	0	6		9
Ditto, from 8 to 12in. girt, per foot run ...	0	4	0	8	1	0
4½in. reveals or margins, per ft. run ...	0	3	0	3		6
9in. do. do. do. do.	0	4½	0	4½		9

N.B.—The above prices for materials are reckoned at 5/6 per bag for Portland Cement, and 9d. per bushel for clean-washed sand mixed in the proportion of 1 of cement to 3 of sand, and averaging ¾in. thick.

If 1 of cement and 2 of sand is required, add one-fourth to the price of the materials.

Mitres and stops in Plaster or Cement, cornices, reckon 1ft. extra.

If wages or materials alter in price, add or deduct.

Material required for ¾in. thickness of Compo Portland Cement Plastering—

1 bushel cement and 1 bushel sand will cover 3 sup. yards.
1 bushel cement and 1½ bushels of sand will cover 3¾ sup. yards.
1 bushel cement and 2 of sand, 4½ sup. yards.
1 bushel cement and 3 of sand, 6 sup. yards.
1 bushel cement and 4 of sand, 7½ sup. yards.

N.B.—By adding ½ to the number of sup. yards, the area at ½in. thick, or deducting one-third, the area at 1in. may be obtained.

Covering Power of Cement Stucco.

1 cask of Cement = 3½ cubic ft., and 2 casks of sand 7 cubic ft. When mixed will form about 9 cubic ft. (as 1½ cubic ft. being taken up by voids of sand) and will cover—

12 super yards, 1in. thick; 18 super yards, ¾in. thick; 24 super yards, ½in. thick.

Labour.—One man will float and finish 18 square yards per day, or average 28 yards per hour, ¾in thick.

Body coat of cement usually 1 to 4. Finishing coat, 1 to 2. Facing only, 1 to 1.

KEENE'S CEMENT.

70lbs. = ¼ cask Keene's cement (280lbs. per cask) will cover about 13 square yards ⅛in. thick on Portland cement ground.

70lbs. of Keene's Cement and 2 cwt. of sand for coring will cover 15 square yards ½in. thick. Allow 12 gals. of water for latter quantity.

Labour.—One man can finish 10 yards, ⅛in. thick, in 6 hours.

KEENE'S CEMENT WORK.

Dubbed out with Cement Compo.

Per yard super.	Materials. s. d.	Labour. s. d.	Total. s. d.
Superfine cement trowelled on brick or stone	2 6	2 6	5 0
Per foot super.			
Facias, jambs, pilasters, architraves	0 8	1 0	1 8
Plain mouldings, medium cement	0 9	1 2	1 11
Ditto, skirtings, 9 to 18in. high, with 3in. moulded, or sunk and moulded	0 9	1 6	2 3
Superfine cement, plain faced and polished ...	0 9	2 0	2 9

If circular, as in columns, groins &c., add one-third.

The above items are reckoned to contain one-third Keene's cement to two-thirds clean, sharp sand, and plain work to average ¾in. thick.

White Cement finish, same as Keene's, per square yard, 4/–.

LIME WHITE, WHITEWASHING, &c.

Per super yard.	Labour s. d.
Lime white, per coat (lime and water)	0 3
Ditto, two coats do.	0 4
Wash, stop and white-washing with whiting and size to old work	0 6
Ditto, to old ceilings	0 8
Plain cornice washed, stopped and whited, per foot super, with whiting and size—one coat, 4d.; two coats...	0 6

Half a bushel of quick lime is required for 70 super yards of lime-white, one coat. 12lbs. whiting, ½lb. blue black, and 7 quarts size will do the same quantity of white-wash, equal to 40 s. yds. per gal.

Cement stucco or plaster is often coloured with lime white, mixed with about one-fifteenth the quantity of raw linseed oil; black oil or common tallow will do if mixed hot or during the slaking of the stone lime.

One gallon will cover from 35 to 40 sup. yards one coat, or about 28 sup. yards two coats.

Although nearly waterproof, it will seldom withstand continuous driving rain on exposed walls.

LATHING.

Metal lathing has become a necessity in building construction and its employment is ever increasing. It is **Fire Resisting and Vermin Proof** and has numerous advantages over wood lathing. It should be fixed securely, longways of the sheet across the bearers, to ensure a level and rigid ground to receive plaster. The strands in the various sheets should all slope in one direction, in vertical work they should slope inwards and downwards from the plaster face. Fixed at intervals —not more than 4in. for the lightest, and not more than 3in. for the heaviest—by staples or nails to woodwork, and by wire or clips to steel work, and wired together at similar intervals between supports. The sheets should be overlapped not less than one mesh where they join. Overlaps should not be made at angles or curves, but should be bent to secure a proper " Key " for the plaster.

" **Expamet** " Lathing is made in various meshes and gauges to suit all grades or work.

Sheets 9 ft. x 2ft.				Price per sq. yd.
No. 250	$\frac{3}{8}$" mesh	26G.	2¼lbs per sq. yd.—Spacings to 12" centres	1/9
,, 252	,,	24G.	3 ,, ,, ,, ,, 14" ,,	2/–
,, 254	,,	22G.	3¾ ,, ,, ,, ,, 16" ,,	2/6
Other Grades in Flat Sheets.				
No. 18 x ¾"	mesh	$\frac{3}{32}$" x 18G.,	3¾ lbs. per sq. yd. 8′ x 4′ 6″ ...	2/3
,, 20 x ¾"	,,	⅛" x ⅛"	13¼lbs. ,, ,, 12′ x 6′	4/–
,, 25 x ⅜"	,,	$\frac{3}{32}$" x 20G.	5lbs. ,, ,, 8′ x 6′ ...	3/–
,, 55 x ¼"	,,	$\frac{5}{32}$" x 18G.,	12¼lbs. ,, ,, 8′ x 5′ ...	4/10

Further particulars—See Advt. page 5.

PARTITION FRAMING STEEL AND FASTENERS.

	20ft Lengths. Per lin. ft.
Cold Rolled Channels, ¾in., 2d.; 1in.	2½d.
Cold Rolled Slotted, 1½in., 4d.; 2in.	6d.
Corner Bead—Galv., 10ft. lengths, 3d.; Exp. Metal Angle, 8ft. lengths	4d.
Self Centering Clips, No. 4-4-10, 1/6 doz.; No. 7, 2/–; Trussit Clips	1/9

See Concrete Section.

AN AVERAGE DAY'S WORK (8 hours) of a good TRADESMAN PLASTERER.

Labourer (scaffolding not included).

Floating walls only, 75 square yards in picking up lime mortar. Floating Ceilings, 65 square yards.

Average Day's Work (cont.)

Setting Walls, 75 sq. yards, in fine screened lime and plaster of Paris.

Ditto, if fine trowelling, 50 sq. yards.

Setting Ceilings, 60 sq. yards.

Setting Cornices, Plaster Mould, Straight run, 9in. x 6in. or 16 girt, 50 feet and 4 mitres.

Setting Room, 15ft. x 12ft., containing 20 yds. ceiling, 3ft. frieze,

Ditto, 45ft. 9ft. x 6ft. Cornice and 8 mitres 5 ft. chimney breast.

TWO MEN, ONE DAY (*Labourer or scaffolding not included*).

CEMENT MORTAR WORK.

Cementing walls, ½in. thick, 35 sq. yards per day.

Cement skirting, 9in. x 1in., one man, 60 ft. run per day.

Cement coping, 15in. x 4in., per yard overall, 12 yards per day.

Cement cornice mould, 9ft. x 6in. (4 members), 35ft. run.

Forming each mitre or return of abovementioned, 3/4 hour each extra.

Cementing No. 12 Concrete Lintels, 5ft. 12in. face and 4in. soffit.

Cementing Bressimer, No. 3, 24ft. long, 2ft. face, 1ft. soffit in dry cement.

Cementing plain cement floors, 1in. thick, finished smooth, 15 sq. yards; same, ¾in. thick, 18 sq. yards.

Cementing Paths, finished smooth and jointed, if coloured red, 12 sq. yards.

Cement Rough Cast, fine metal, ¼in. straight work, 40 sq. yards.

Ground floor work, General 1 labourer, can supply 2 plasterers "floating," or 6 plasterers setting.

FIBROUS PLASTER.

FIBROUS PLASTER CEILINGS AND CORNICES.

Its peculiar adaptability for all classes of building, its straight, smooth surface, the beauty and variety of designs; its wonderful fire-resisting qualities, and the facility with which it can be forwarded to any part of the Commonwealth have brought it into general use.

PLAIN FIBROUS PLASTER SHEETS.

Widths.	Lengths.	per sq. yard.
18″ to 54″.	3 ft. to 12 ft.	1/6

Crating 3d. per sq. yd. extra.

ORNAMENTAL PLASTER SHEETS.

2/2 per sq. yd. crated.

Plaster Margin Moulds (crated), 8d. to 1/– lineal foot.

Plaster Cover Moulds in 10ft. lengths, 2″, 14/6. 3″, 20/6 per 100 lineal feet.

Plaster Cornices, sizes 3″, 4″, 6″, 8″ and 9″, per inch Girth per foot 1d.

Flat Head Galvd. Nails, 1″ and 1½″ x 13G., 8d. pound.

Diamond Plaster in 300 pound casks 42/– per cask or 17/6 cwt.

Victor ,, ,, 112 ,, Bags 9/– ,,

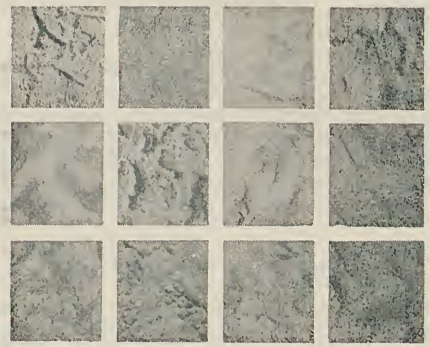
Waratah ,, ,, 112 ,, ,, 9/– ,,

Victor Hard 112 ,, ,, 13/6 ,,

DECORATIVE PLASTER

This plaster is a product of gypsum, and is best worked in two coats on a cement rendered on floating coat base. It is slow setting, smooth working and has a hard durable surface, free from cracks, when finished.

The first or key coat is applied thinly on the cement base. The second coat is trowelled to an even surface and decorative relief design patterns worked into it with trowel, sponge and brush. A coarse brush is used for a scratched design.



Some designs necessitate a broom brushed vertically on the back ground and the plaster cast on with trowel for an uneven design.

Mix only enough plaster for 1½ hours' work. Use dry wood screens over doors, windows and angles, but wet one day before plastering to prevent buckling and swelling afterward.

Do not mix gauges together but add fresh plaster from bag if necessary.

Keep walls from drying too quickly in summer.

Sold under various trade names, such as "Victortex," "Plastic cement," "Snowcrete," "Lime Hyd," (Hydrated lime).

80lb. calico bags cover 16 to 20 square yards surface.

Cost **Labour** and Materials, 2/6 per sq. yard.

Can be coloured if desired.

Scagliola (wall linings) tiles 7in. thick, joints sawn square laid. on brick or Terra Cotta, secured by copper bonds, 40/– per sq. yard. Circular or curved, 45/– per sq. yard.

TERRAZZO.

Terrazzo pavings, cement rendering, laid on sand bed, £2 per sq. yard; special **polished** with patterned margin, or **polished** and brass strips, £2/10/– to £3 per sq. yard.

Laid for Lavatories and bathroom floors, 16/6 per sq. yard;

To Street landings, pattern plain, 20/– per sq. yard.

Terrazzo Margin, 9in. wide, 3/– per foot run.

Stair treads polished, 12 x 1½in. thick bedded, 3/3 per lin. ft. Stair returned ends, 1/– each. String facings, 12 x ¾in. risers and treads, 4/– lin. ft. 6 inch narrow sills, window ledges, 2/6 to 3/6 per lin. ft. 12 x 1½in. Thresholds, 3/–. 12 x 1in. Stair flight strings 4/6, 11″ x 1½″ nosed treads, 3/3 per foot run.

Polished **Terrazzo 5ft. Margins** on walls 1½in. thick, 6/6 per s. ft.

Cement paving to floors 1″ thick, 16/6 per sq. yard; 1″ thick to stair tread landing risers, 10/6 per sq. yard.

Drilling of hinges for door opening, 6/– each.

Rounding off tread and landing edges, 1/6 per foot run.

Special selected paving and including pattern, 40/– per s. yard. 3″ to 1″ cement plain Terrazzo pavings to intermediate landings, 20/– per s. yard. Nosing winders, 1½″ thick, 4′ 9″ x 2′ 3″, 13/6 each; 5′ x 2′ 6″ winders, 14/– each; 5′ 9″ x 2′ 3″ winders, 15/9 each.

Cement rendered Fine Bluestone paving, ¾″ thick, 2/6 per super yard.

MEMORANDUM TO SLOW SET.

Organic or impure sand sets too slowly for plaster. For show set remedy add 4 oz. A.G.P. Accelerator Plaster Setting to 1 Sack of Plaster, or crush some plaster droppings, screen and use a quart to each sack of plaster; or add quart of hydrated lime to the bag, or 1 pound of alum to 17 gallons of water.

MODELLER, &c.

Labour, 28/– per day.

Items each.	Modelling. £ s. d.	Plaster Castings fixed. £ s. d.
Ionic capital, for 12in. column	6 0 0	3 4 0
Ditto 18in. column	9 0 0	4 0 0
Ditto 24in. column	12 0 0	6 0 0
Corinthian or Composite capital, for 12in. column	7 10 0	4 0 0
Ditto do. 18in. column ...	10 10 0	6 0 0
Ditto do. 24in. column ...	14 0 0	8 0 0

Pilasters the same as capitals, quarter pilasters one-half.

MODELLER, &c. (*continued*)

Items each. **Labour, 28/– per day.**	Modelling. £ s. d.	Plaster Castings fixed £ s. d.
Modillon enriched, 4in. projection	1 10 0	0 3 0
Ditto 6in. projection	1 16 0	0 4 6
Ditto 8in. projection	2 0 0	0 6 0
Trusses enriched, 10in. x 5in.	1 16 0	0 10 0
Ditto 12in. x 6in.	2 2 0	0 12 0
Ditto 18in. x 9in.	3 0 0	0 18 0
Paterae or rosette, 4in. diam.	0 12 0	0 2 0
Ditto 8in. diam.	0 10 0	0 6 0
Centre or ceiling flower, 12in. diam.	1 16 0	0 8 0
Ditto 18in. diam.	2 8 0	0 8 0
Head on keystone, 12in. deep	1 7 0	1 0 0
Ditto 15in. deep	1 10 0	1 8 0
Ditto 18in. deep	1 16 0	1 12 0
Acanthus, or lotus leaf, 8in. high	0 18 0	0 4 0
Ditto 12in. high	1 7 0	0 8 0
Oak or laurel wreath, 9in. diam.	1 10 0	0 6 0
Ditto 12in. diam.	2 2 0	0 8 0
Ditto 18in. diam.	2 14 0	0 12 0
Per foot run.		
Egg and dart moulding, 2in. girt	1 0 0	0 1 0
Ditto do. 4in. girt	0 18 0	0 1 4
Ditto do. 6in. girt	1 8 0	0 1 8
Rope or cable do. 2in. girt	1 0 0	0 1 6
Ditto, round spiral column	1 4 0	0 2 6

Casting Ceiling Flowers from 2ft. to 5ft. diam. will cost about 4/– per sup. ft., as ascertained by squaring the diam. (2ft. diam. = 4 sup. ft. and 3ft. diam. = 9 sup. ft., &c.).

PATENT FLOORINGS AND PAVINGS.

There are on the market several materials for covering concrete, wood or brick floors.

Some of these materials have Portland cement as a matrix. The preparations known as "**Ironite,**" "**Arkilite,**" &c., adhere perfectly to concrete or brick. Others, however, of **magnesite composition,** have the further advantages that they also adhere equally well to wood or iron, and whilst capable of hard, wear-resisting finish, have a resilience that renders them almost like a linoleum to the tread, which makes them very acceptable for indoor flooring. They also are made in various permanent colourings so that most artistic effects can be produced. Some "**Ironite**" pavings have been in use for 45 years and are still in fair order.

Further particulars can be obtained from the several makers who afford special quotations according to the description and quantity of work required.

MAGNASITE FLOORINGS.

Magnasite Floorings, generally laid on site in various colours, from cream, greens, blues reds and browns, forming a jointless composition sawdust paving or walling with different names.

" **Aegypto** " different designs, 12/– to 18/– per sq. yard, laid and finished.

" **Manco** " 12/– to 15/– per sq. yard.

" **Permasite** " and " **Linwood,**" similar constructed pavings but varying in composition and colouring, 12/– to 18/– per sq. yard, according to quantity.

Cupping and Skirting to bath-room walls, per ft. run, 9d.

Terrazzo effects can be produced in Magnasite floorings within the above price.

OTHER COMPOSITION PAVINGS.

There are many makes of cement composition. Pavings sold under different names, viz.—

" **Arkilite,**" " **Ironite,**" " **Steelite,**" " **Oronite,**" " **Xylite,**" all about the one price—9/– to 11/– per yard, laid; also made into verandah nosings, door thresholds, &c., ready for setting.

Mottled Terrazzo is composition of cement in situ with chips of granite or marble of different colours, and worked into patterns, borders, letters, or elaborate designs, and afterwards ground down to uniform surface when drying. This material is also made in slabs and fixed as dadoes and wall covers in place of marble.

The price when laid is according to design, from 16/– to 30/–.

PATENT LIGHT AND STRONG STEEL-FRAMED STRUCTURES.

Hyrib Reinforcement, in Partitions, used horizontally, without intermediate studs. For price *see* Concrete Section.

Hyrib is made with deep strengthening ribs pressed into a flat perforated sheet of open hearth steel, and forms a rigid sheet lengthwise.

In suspended ceilings these sheets are placed with rib uppermost for strength, leaving the even surface under for plastering.

For partitions or walls about 2ins. thick the ends are secured by strong gal. iron staples or nails to wood or stout wire, and plate clips to iron supports. The ribs are generally played horizontally, interlocking joints, with a cement body plaster of 1 cement to 4 sand or cinders, and formal finishing coat of white Keene's cement or Meduca Cement.

Reinforced Cement Walling, 2in. thick, bolted together in sections, per sq. yard finished, 15/– to 21/–.

MOULDING PARTITIONS BEFORE ERECTING.

Make the frames of light steel angles, with cross bars, to which are wired any of the many forms of metal reinforcements, whether of woven wire mesh, expanded metal, patent lathing, Herringbone Expanded lathing, or steel rods.

Method.—These frames are laid upon a table or pallet, piled in with concrete tramped solid, and left to harden.

The sections are erected in a cradle before being thoroughly dry, bolted together through the steel angles at the edges, the **hand-holes** to these bolts then being filled and stopped with concrete.

The panels or units (usually 2ft. 8in. to 4ft. 6in. wide by 10ft. or 11ft. high) according to standards or uprights, being completely erected, the concrete walls or partitions are then rendered with a coat of cement together with a water-proofing composition to give a finished appearance to the structure. This may be smooth or with a rough cast coating.

COKE BREEZE PARTITION BLOCKS.

	Material per yd.	Fixed net
	s. d.	s. d.
2½in. thick per square yard	3 6	7 6
3in. thick	4 0	8 6
4in. thick	5 0	10 6
4½in. thick	6 6	12 0

Generally in building blocks of 18in. x 9½in. high, compressed to work "bond" with brickwork.

Labour and cement, per sq. yard, from 2/6 to 5/6 per sq. yd. fixed and finished both sides. (*See Pantiling, Constant of Labour*).

Special Lintels for breeze block partitions, 2 courses, 10d.; 3 courses, 1/–.

	s. d.
Terra Cotta Lumber, 12 x 6 x 2in. thick, weight 104lbs. per sq. yd.	3 3
Ditto blocks, 15 x 9¾ x 3in. thick, weight 130lbs. per sq. yard...	3 6
Ditto, 15 x 9¾ x 6in, thick, weight 240lbs. per sq. yard ...	5 6

PLUMBERS' MATERIAL (Sundries).

Muriatic Acid in 2 gallon jars, 8/6. Jars, 6/– extra.

Pipe Hooks—Black. ½″ ¾″ 1″ 1¼″ 1½″ 2″ 2½″ 3″ 3½″ 4″.
1/– 1/– 1/2 1/4 1/6 1/9 1/11 2/5 3/– 3/2 doz.

Italian Hemp Packing, 1/7 pound. Tarred Gasket, 11d. pound.

Fluxite Soldering Flux, 5 oz. tins, 2/8. 14 oz. tins, 5/9 ea.

Stencil Ink, 8 oz. cakes, 1/4 ea. Pipe Jointing Compound, 2/9 pound.

Dog Nails, 2″, 8d. 2½″, 9d. 3″, 10d. doz.

Lead Cones—Flush Pipe and Back Vent, 9d. ea. Rubber Do. 1¼″, 1/3 ea.

Lead Lugs, 1¼″ 3d. 1½″, 3d. 2″, 6d. ea.

Copper Balls for Ball Cocks, 4½″, 1/10. 5″, 3/6. 6″, 4/6. F/faced 4½″, 2/5 ea.

N.P. Cups for Flush Pipes. Plain, 1¼″, 10d. ea. Do. w/– Buffer, 1/– ea.

Galvanized Flush Pipe Clips. Plain, 4d. Do. w/– Buffer, 6d. ea.

Tinmens Rivets, No. 6, 1/–. 8, 1/2. 9, 1/5. 10, 1/10. 12, 2/7. 14, 3/11 per thousand.

Testing Plugs with Cocks, 4″, 14/5. 6″, 21/10. No Cocks, 4″, 12/11. 6″, 20/4 ea.

See Adverts, pp. 2, 22, 36.

PLUMBERS' WORK

GALVANISED IRON.

Measurements.

Lead work is usually charged by the lb. or cwt.

Close copper nailing and overlaps, soldering to joints, by the ft. run.

Water and Gas pipes by the ft. run.

Gas and Water Fittings by the number of points of exit.

Galvanised Corrugated Iron Roofing and Ceilings by the square or 100 super ft.

In measuring eaves gutters, for every angle reckon 3ft. extra of gutter, or else add the price of the angles separately.

Valley and Ridge capping should be at least 24 gauge, although 22 gauge would be better still.

Gal. Iron will last at least seven years without painting. If painted, non-poisonous paints should be used if the rain water is utilised for drinking purposes. Oxide of iron paints preserve.

GALVANISED CORRUGATED IRON.

Made in sheets 5ft., 6ft., 7ft., 8ft., 9ft., 10ft., 11ft., and 12ft. long by 2ft. 3in. wide, with 3in. corrugations, or 2ft. wide with a lap of one corrugation, which is sufficient for fences ; but a lap of two corrugations is required for ordinary roofs, with an end lap of at least 6in.

WEIGHT AND COVERING CAPACITY OF GALVD. IRON.

Per square of 10ft. x 10ft.	Gauge. 24	26
	lbs.	lbs.
Lapped 2 corrugations	180	130
Lapped 1 corrugation	150	110
One ton of iron will cover—		
7ft. sheets cover, 2 sheets span, 6in. centre lap and 2 corrugations, making covering 13ft. 6in. x 1ft. 9in. wide	Squares 14.20	18.86
2 cases of 10ft. sheets, 1 sheet span, will cover	15.60	19.60
Squares per ton, lapped 1 corrugation ...	15.00	20.36
Ditto. do. lapped 2 corrugations ...	12.44	17.23

This calculation is made from the average number of 5ft. and 6ft. sheets per ton, reckoning five of each for single lap, and six of each for double lap, and 12in. for end laps per square.

One packet of Spring Head Nails (100) is usually allowed to one square of roofing.

GALVD. CORRUGATED IRON.

Lysaghts Tables—Ton Rates—Shewing Price per Sheet.

Price per ton	Length of Sheet 24 Gauge	5	6	7	8	9	10ft.
£25		3/–	3/7½	4/3	4/10½	5/6½	6/1
£26		3/1½	3/9	4/5	5/1	5/9	6/4
£27		3/3	3/11	4/7	5/3½	6/–	6/7
£28		3/4½	4/0½	4/9	5/6	6/2½	6/10
£29		3/6	4/2½	4/11	5/8	6/5	7/1
£30		3/7½	4/4	5/1	5/10½	6/8	7/4
	26 Gauge.						
£25		2/1½	2/6½	3/–	3/5	3/10	4/4
£26		2/2½	2/8	3/1	3/7	4/–	4/6
£27		2/3½	2/9	3/2½	3/8	4/2	4/8
£28		2/4½	2/10½	3/4	3/10	4/3½	4/10
£29		2/5½	2/11½	3/5½	4/–	4/5½	5/–
£30		2/6½	3/1	3/7	4/1	4/7½	5/2

GALVD. IRON CORRUGATED SKYLIGHTS.

Feet.	5	6	7	8	9	10	11	12
26G. Fixed	22/5	23/–	23/7	24/2	25/3	26/8	27/9	28/10 ea.
,, Opening	36/8	37/3	37/10	38/11	39/9	40/11	42/3	43/4 ea.

Glazed with $\frac{3}{16}$″ Mill Rolled Glass 42″ x 18″.
If Glazed with Wire Cast, 3/3 ea. Extra.

Double Skylights—Twice the price of Single, plus 8/6.

See Advt., p. 22.

GALVD. CORRUGATED IRON.

Sheets per ton	5ft.	6ft.	7ft.	8ft.	9ft.	10ft.
24 gauge ...	166	138	118	102	90	82
26 ,, ...	236	196	168	146	130	116
28 ,, ...	264	222	190	166	148	132

CEILING IRON (1 in. Corrugations).

£32 per ton.

Lengths ...	5ft.	6ft.	7ft.	8ft.	9ft.	10ft.
Sheets in case, 26 g. ...	122	99	86	75	67	60

GALVANISED CORRUGATED IRON.

Labour only, per square.

Present wages of Plumber, per hour, 2/9½.

Hip roofs, covered with corrugated gal. iron, 24 to 26 gauge, double laps	9/– to 10 0
Gable roofs, do. do.	7/6 to 9 0
Ditto, no cutting, and 4 sheets run flat roofs	6/– to 8 0
Balcony, verandah, curved roofs	10/– to 15 0
Small corrugated sheets, ceilings	10 0
Fences, 6ft. sheets, screwed, bottom, top, middle, and sides of sheets	6 0
Ordinary mixed roof hips, valleys, gables, average	9 0

Curving Galvanised Corrugated Iron, per sheet 6d. to 1/–.

Present Contract Prices, per square, fixed––	£	s.	d.
Corrugated iron roofs, 24 gauge	2	15	0
Corrugated iron roofs, 26 gauge	2	3	6
Corrugated ceilings, small section, 26 gauge	2	11	0
Gal. iron hips and ridges and valleys, per ft. run ...	0	1	6

PLAIN GALVD. SHEET IRON.

Lysaghts Tables—Ton Rate Shewing Price per Sheet.

	24G.			26G.			28G.	
Price per Ton.	24″ Wide	30″ Wide	36″ Wide	24″ Wide	30″ Wide	36″ Wide	24″ Wide	30″ Wide	36″ Wide.
£25	2/11	3/7½	4/4½	2/0½	2/6½	3/0½	1/9	2/2½	2/7½
£26	3/0½	3/9½	4/7	2/1½	2/8	3/2	1/10	2/3½	2/9
£27	3/2	3/11	4/9	2/2½	2/9	3/3½	1/10½	2/4½	2/10
£28	3/3	4/1	4/11	2/3½	2/10½	3/5	1/11½	2/5½	2/11½
£29	3/4½	4/2½	5/1	2/4½	2/11½	3/6½	2/0½	2/6½	3/0½
£30	3/6	4/4	5/3	2/5½	3/0½	3/8	2/1	2/7½	3/2
No. of Sheet per ½ ton case	86	69	57	123	98	82	143	114	95

Gutter Brackets, short tail, 2/4 long tail, 3/9; overstraps, 2/– per doz.; astrigals, 7/3 per doz.; spikes, 1/4; with tubes, 2/– doz.

Gal. iron screws, 1¾ x 12 gauge, 107/6 cwt., 1/1 lb.; 2 x 12 gauge, 104/8 cwt., 1/0½ lb.

Gal. cone head bolts and nuts, ½ x $\frac{7}{32}$, 3/1 gross, 4d. doz.; spring head nails, plain shank, 53/6 cwt. or 7d. lb.; twisted, 57/3 cwt., 8d. lb.; awning hooks for T and angle iron, gal., 1/6 doz.; awning clips, 1/3 doz.

See Advt., pp. 2, 22, 36.

SANITARY BRASSWARE.

	2″	2½″	3″
Gully Traps	15/7	17/4	20/2 ea.
,, Sleeves (Plain)	3/5	4/8	5/5 ,,
,, ,, w/- I.O.	9/2	10/5	13/9 ,,
,, ,, Vent & I.O.	—	12/8	15/- ,,
,, Tops Single	11/9	12/1	20/6 ,,
,, ,, Double	13/9	—	— ,,

Gully Risers	4″	6″	9″	12″	15″
Plain	7/6	8/7	10/5	15/7	18/- ea.
With Grate	8/11	10/1	12/1	17/4	19/7 ,,
With N.P. Grate	9/9	11/-	13/-	18/2	20/8 ,,
With C.P. Grate	10/3	11/6	13/6	18/8	21/3 ,,

Union Traps.	1¼″ x 1¼″	1¼″ x 1½″	1½″	2″
P. Brass	7/2	7/6	7/6	8/7 ea.
S. ,,	8/7	9/2	9/2	11/- ,,

Juntions.	1¼″	1½″	2″ x 1½″	2″	2½″	3″
With I.O.	3/5	3/9	5/2	5/2	15/1	19/10 ea.
Do. 45°	4/11	5/8	7/2	7/2	15/7	20/8 ,,
Plain	2/6	3/-	4/1	4/1	13/4	17/7 ,,
Do. 45°	3/8	4/6	6/-	6/-	14/5	19/6 ,,

Elbows	1¼″	1½″	2″	2½″	3″
Plain	1/9	2/2	2/11	9/6	11/6 ea.
I.O.	2/5	2/11	3/7	11/7	13/9 ,,

BRASS TESTED FITTINGS FOR WATER MAIN CONNECTIONS.

	½″	¾″	¾″ x ½″	1″ x ¾″	1″	1¼″	1½″	2″
Adaptors	1/1	1/1	1/5	1/6	1/6	2/3	3/2	4/6
Bends	1/11	2/-	—	—	3/1	4/9	8/8	11/-
Sockets	1/2	1/3	—	—	1/9	2/9	3/8	4/9
F. Unions	3/2	4/8	—	—	6/3	8/3	12/-	15/2
M & F ,,	4/-	5/6	—	—	7/3	9/5	14/1	18/10

HIGH PRESSURE TESTED BRASSWARE.

	½″	¾″ x ⅝″	1″	1¼″
Bib Cock T.H.	3/2	3/5	8/8	25/- ea.
Hose ,, ,, with C. & L.	4/6	4/8	12/-	

Main Cocks & Elbows	¾″	¾″ x 1″	1″	1″ x 1¼″	1″ x 1½″
Each	10/5	10/6	14/6	18/11	21/6
Meter Cocks	5/9	6/9	8/7	25/7	
				1¼″	1½″
Path Cocks	6/6	8/-	9/8	19/5	24/3

Further Information and Complete Price Lists, on application, *see Manufacturers Advt., pp.* 2, 22, 36.

THE ASSOCIATED H/WARE MANUFACTURERS OF N.S.W.

Standard Price List. March, 1938.

GALVD. IRON DOWN PIPE (Round).

Lengths. Diameter	28G. 6ft.	28G. 8ft.	26G. 6ft.	26G. 8ft.	24G. 6ft.	24G. 8ft.
2 inch	1/3½	1/9	1/4½	1/10½	1/9	2/4½
2½ ,,	1/6½	2/0½	1/7	2/2½	2/1½	2/9½
3 ,,	1/8	2/3	1/9	2/5	2/5½	3/4
3½ ,,	2/–	2/7½	2/1	2/10	2/9	3/7½
4 ,,	2/2½	2/10½	2/3½	3/2½	3/0½	3/11½
5 ,,	2/9½	3/6½	2/10	3/10½	3/10	5/0½
6 ,,	3/2½	4/2½	3/5½	4/7	4/8	6/1½

GALVD. IRON DOWN PIPE (Square).

Lengths.	6ft. x 28G.	6ft. x 26G.	6ft. x 24G.
3 x 2	2/–	2/1	2/8
4 x 2	2/2½	2/4½	3/2½
4 x 3	2/4½	2/7½	3/6½
4 x 4	2/9	3/1	3/11

GALVD. IRON DOWN PIPE HEADS 26G.

2	2½	3	3½	4in.
7/–	7/10	8/8	9/3	10/5 each.

GALVD. IRON GUTTERING O.G. or Quad.

Lengths	28G. 6ft.	28G. 8ft.	26G. 6ft.	26G. 8ft.	24G. 6ft.	24G. 8ft.	
4″	1/6	2/–	1/7½	2/1½	2/–	2/9½	per length
4½″	1/7	2/1	1/8	2/2½	2/3	3/–	,,
5″	1/8	2/3	1/10½	2/6	2/5	3/2½	,,
6″	2/–	2/8½	2/2½	2/10½	2/9½	3/9	,,

ANGLES O.G. or QUADRANT.

	26G.	24G.
4″ Internal & External	2/5	2/7½ each
4½″ ,, ,,	2/7½	2/9½ ,,
5″ ,, ,,	2/8½	2/10½ ,,
6″ ,, ,,	2/9½	3/– ,,

GALVD. IRON RIDGING.

Lengths	28G. 6ft.	28G. 8ft.	26G. 6ft.	26G. 8ft.	24G. 6ft.	24G. 8ft.	
12″	1/10½	2/6	2/–	2/8½	2/8½	3/6½	per length
14″	2/1	2/9½	2/4	3/1½	3/0½	4/1	,,
15″	2/3	3/–	2/5½	3/4	3/4	4/4½	,,
16″	2/4½	3/2½	2/7½	3/6	3/6	4/7	,,
18″	2/8	3/6½	2/11½	3/10½	3/10½	5/2½	,,
20″	3/–	3/11	3/2½	4/3½	4/3	5/8½	,,

See Manufacturers Advt., p. 22.

Louvres, Galvanised, Stamped Pattern, 7/6 doz.
Pipe (Vent), 4in. x 18G., per 6ft. length, 7/–.
Labour, fixing, from 4d. to 8d. per foot.
Labour only—Downpipes, Gal. Iron Gutterings (according to size and gauge)—

	s. d.		s. d.
Fixing down pipe, including solder, per foot ...	0 3	to	0 8
Fixing spouting or eaves, guttering, per foot ...	0 4	to	0 8
Fixing plain sheet gal. iron on partitions, advt. hoardings, nailed around edges with clouts 4ft. apart, per square	10 0	to	15 0
Fixing ridges, including screws and washers, per 6ft. length	1 6	to	2 6

GALVANISED TANKS.

24 G. Galvanised Iron Tanks, fitted with Tap and Overflow—
200 gal., weight 90lbs., 54/7; 400 gal., weight 142lbs., 91/2; 600 gal., weight 185lbs. 103/6; 800 gal., weight 214lbs., 117/2; 1000 gal., weight 256lbs., 132/4.
Material only—400 gal., 63/–; 600 gal., 73/–; 1000 gal., 92/–; 1500 gal., 125/–; 3000, £9 16s.
Tank rivets, and washers, 9d. to 1/3 per lb.

RAINWATER PIPES

MALLEABLE CAST IRON RAINWATER PIPE (ROUND).

	Size Dia. 2in.	2½in.	3in.	4in.
	s. d.	s. d.	s. d.	s. d.
6ft. Lengths	9 0	10 3	11 0	13 3
4ft. Lengths	6 9	7 6	8 0	10 3
3ft. Lengths	6 6	7 3	7 6	9 6
2ft. Lengths	6 0	6 9	7 0	8 9
Bends	2 6	4 0	4 0	6 6
Heads	6 0	6 3	6 6	6 9
Shoes	2 6	2 9	3 3	6 6
Sockets	1 9	2 0	2 0	2 3
Single Junctions	3 0	4 3	4 9	7 3
Double Junctions	6 0	7 9	8 3	12 3
Reducing Sockets	—	—	3 9	4 3
SWAN NECKS OR OFF-SETS—				
3in.	3 9	4 0	4 0	7 9
4½in.	3 9	4 0	4 0	8 0
6in.	3 9	4 0	4 3	8 0
9in.	5 3	5 9	6 3	8 3
12in.	5 9	6 0	6 6	9 0
18in.	7 6	8 0	8 9	12 6
21in.	7 6	8 9	8 9	12 9
24in.	7 9	9 3	9 3	13 3

RAINWATER C.I. PIPES (SQUARE).

SQUARE RAINWATER PIPES AND FITTINGS—

	Materials.			
	each	4 x 3	4 x 4	5 x 4	6 x 4
Pipes 6ft. lengths ...		19 9	20 6	25 3	28 6
Shoes		11 6	11 6	11 6	12 0
Bends		12 0	12 0	12 3	12 9
Offsets, 3in.		12 6	13 0	13 6	14 0
,, 4½in.		12 9	13 3	14 0	14 3
,, 9in.		15 0	15 3	16 0	17 3
Union Sockets		3 6	3 6	4 0	4 9
Loose Ears		3 6	3 6	3 9	3 9
Heads		29 9	30 9	32 0	33 0
Branches		12 3	14 0	15 0	16 3

GRATINGS. Round. C.I. Plain or Cut.

4″	5″	6″	7″	8″	9″	10″	11″	12″ Diameter
5d.	6d.	7d.	8d.	1/–	1/2	1/5	1/9	2/5 each.

DITTO. Square.

4″	5″	6″	7″	8″	9″	10″	11″	12″ Diameter
1/–	1/1	1/4	1/5	1/8	1/11	2/5	3/7	3/9 Each.

Footpath Boxes W. & S. B. Pattern 2/5 each.
Country ,, 2/5 ,,
"Gas" ,, 2/5 ,,

Inspection Boxes. Regulation Pattern, 2/– each.

WATER, GAS AND STEAM PIPES.

	Galvanised		Black	
	per 100ft.	per ft.	per 100ft.	per ft.
⅛″ ...	30/–	3.6	26/8	3.2
¼″ ...	25/–	3.00	20/10	2.5
⅜″ ...	19/11	2.39	15/11	1.91
½″ ...	25/9	3.09	20/8	2.48
¾″ ...	31/8	3.8	25/4	3.04
1″ ...	43/4	5.2	34/9	4.17
1¼″ ...	60/11	7.31	48/9	5.85
1½″ ...	77/4	9.28	61/11	7.43
2″ ...	103/1	12.37	4/2/6	9.9
2½″ ...	7/19/4	19.12	6/7/6	1/3.3
3″ ...	9/2/10	21.94	7/6/3	1/5.55
3½″ ...	16/10/–	3/3.6	14/10/–	2/10.8
4″ ...	18/ 4/5	3/7.73	16/ 0/3	3/2.43
5″ ...	24/15/–	4/11.4	21/15/–	4/4.2
6″ ...	30/18/9	6/2.25	27/ 3/9	5/5.25

	Steam per 100ft.	per ft.	Weight per 100ft. Cwt.	Qr.	lb.
⅛″	30/–	3.6		1	3
¼″	21/8	2.6		1	15
⅜″	19/6	2.34		2	9
½″	25/3	3.03		3	6
¾″	30/11	3.71	1	0	15
1″	42/5	5.09	1	2	15
1¼″	59/7	7.15	2	1	8
1½″	75/8	9.08	3	0	0
2″	5/0/10	1/0.1	3	2	2
2½″	7/15/10	1/6.7	5	1	0
3″	8/18/9	2/1.45	6	0	11
3½″	16/10/–	3/3.6	7	0	7
4″	18/4/4	3/7.73	8	0	14
5″	24/15/–	4/11.4	9	3	14
6″	30/18/9	6/2.25	11	3	21

Screwing --

⅛″	¼″	⅜″	½″	¾″	1″	1¼″	1½″	2″	2½″	3″	3½″	4″	5″	6″
3½d	3½d	3½d	4d	4½d	5½d	8d	11d	1/3	2/8	3/3	3/6	4/–	5/–	6/–

per end.

Cutting only--

1½d	1½d	1½d	1½d	1½d	2d	3d	4d	5d	11d	1/1	1/3	1/4	1/8	2/–

per cut.

Wages Award, 2/9½ ; Labourer, at 2/7 per hour.

WATER AND GAS PIPES.

Material and Labour, including Tees, Elbows, complete.

Pipes. inside dia.	Approx. Labour per ft. s. d.	per ft.run Water s. d.	Gas s. d.	Fixed Water s. d.	Gas s. d.
½in.	0 5	0 3½	0 3	0 8½	0 8
¾in.	0 6	0 4½	0 4	0 10½	0 10
1 in.	0 8	0 6	0 5	1 2	1 1
1¼in.	1 0	0 8	0 6¾	1 8	1 6¾
1½in.	1 6	0 10	0 8½	2 4	2 2½
2 in.	2 6	1 1½	0 11	3 7½	3 5
2½in.	3 0	1 9	1 5	4 9	4 5

The number of bends, junctions, cuts, or short lengths increase the cost.

Labour and Materials connecting water to main service (exclusive of W. & S. Board main fittings), including opening ground, boring main, cutting through and making good to walls, floors, &c.

Laying on Gas in the Cities.

Connecting with meter, including all necessary pipes, T. and angle pieces, cocks, &c., fixed to receive lights at per point or connection, average cottage work ... ... s. 25 d. 0

In laying gas-pipes through floors, the **centre of the joists** should not be cut away, because the joists are weakened in proportion to the depth cut away, whereas the ends of the joists (to one-eighth of the span) may be cut away to one-third of their depth, or at one-quarter of the span, to one-sixth of their depth, without in any way weakening them.

Sydney W. & S. Board regulation **size** of pipe permitted, ½ inch gal. iron water pipe for branch service supplying one shower-bath, one lavatory-basin, or one water-closet, urinal, or slop-sink cistern, where the branch pipe does not exceed 7 feet, and the service is directly connected to the Board's water main.

All other iron pipes used for water services shall not be less than ¾ inch internal dia.

EXCAVATION ONLY.

Labour.

For Plumber's Pipes and Filling in same, per yard run.

	s.	d.		s.	d.
12in. to 2ft. deep, general excavation, from ...	0	6	to	1	0
3ft. deep x 12in. wide				1	6
Ditto, extra, through blue metal road, 12in.				1	9
Ditto, extra, through soft sandstone rock, 2ft. deep ...				2	0

MALLEABLE FITTINGS.

A.H.M. Standard Prices. April, 1938.

Galvanized. (Internal Diameter)

	⅜″	½″	¾″	1″	1¼″	1½″	2″	
Backnuts	2d.	2d.	3d.	3¼d.	4½d.	6d.	9¼d.	ea.
Bends M. & F.	6½d.	8d.	10½d.	1/4	2/3¼	3/2½	4/8	,,
,, F. & F.	6½d.	8d.	1/–	1/5¾	2/5	3/7¼	5/4	,,
Caps	2½d.	3¼d.	5d.	6½d.	9d.	1/–	1/6½	,,
Crosses	7¼d.	9d.	1/1	1/5¾	2/–	2/5¾	4/–	,,
Elbows F. & F.	5d.	6½d.	9d.	1/1	1/5¾	1/9¾	2/9¾	,,
,, M. & F.	5¾d.	7¼d.	10½d.	1/2½	1/8	2/2	3/4	,,
Flanges	8d.	9¾d.	1/1	1/4	1/7¼	1/10½	2/5¾	,,
Sockets Plain & Beaded	3d.	4d.	5¼d.	7d.	9¼d.	1/0½	1/6½	,,
,, Diminished	3¼d.	4½d.	6d.	8d.	11¼d.	1/2½	1/9¾	,,
Tees	5¾d.	7¼d.	10½d.	1/2¾	1/8	2/1	3/4	,,
Unions Socket	1/2½	1/5½	1/9¾	2/2¼	2/11	3/10½	5/5¼	,,
Nipples Hexagon	3d.	4½d.	6d.	7¾d.	1/1	1/4	2/–	,,
,, Reducing	—	6¼d.	8¾d.	10¾d.	1/5½	1/11	2/9¾	,,
Bushes	—	3¼d.	5d.	6½d.	9d.	11¼d.	1/9	,,
Wrought Iron Longscrews up to 11″ Long Bare	4½d.	4½d.	5¾d.	8d.	10¾d.	1/2	1/7½	ea.
Do. w/– Socket & B/nut	8d.	9½d.	1/–	1/4	1/8¾	2/3½	3/3¾	,,

MALLEABLE FITTINGS.

Black for Gas. (Internal Diameter)	⅜″	½″	¾″	1″	1¼″	1½″	2″	
Backnuts	2d.	2d.	2¾d.	3d.	4¼d.	5¾d.	8¾d.	ea.
Bends M. & F.	6d.	7½d.	9¾d.	1/3	2/1½	3/–	4/4½	,,
,, F. & F.	6d.	7½d.	11¼d.	1/4½	2/3	3/4½	5/–	,,
Caps	2¼d.	3d.	4½d.	6d.	8¼d.	11¼d.	1/5½	,,
Crosses	6¾d.	8¼d.	1/–	1/4½	1/10½	2/3¾	3/9	,,
Elbows F. & F.	4½d.	6d.	8¼d.	1/–	1/4½	1/8¼	2/7½	,,
,, M. & F.	5¼d.	6¾d.	9¾d.	1/1½	1/6¾	1/11¼	3/1½	,,
Flanges	7½d.	9d.	1/–	1/3	1/6	1/9	2/3¾	,,
Nipples Hexagon	3d.	4¼d.	5½d.	7¼d.	1/–	1/3	1/10½	,,
,, Reduced	5d.	6d.	8¼d.	10d.	1/4¼	1/9¾	2/7½	,,
Sockets Plain	2¾d.	3¾d.	5d.	6½d.	8¾d.	11¾d.	1/5¼	,,
,, Reducing	3d.	4¼d.	5¾d.	7½d.	10¼d.	1/1½	1/8¼	,,
Tees	5¼d.	6¾d.	9¾d.	1/1½	1/6¾	1/11¼	3/1½	,,
Unions (Socket)	1/1½	1/4¼	1/8¼	2/0½	2/8½	3/7¼	5/0¾	,,

Long Screws W.I. (up to 11″ long)	⅜	½	¾	1	1¼	1½	2	
Black Bare	4¼d.	4¼d.	5½d.	7½d.	10¼d.	1/1¼	1/6¼	each
,, W/– B/nut & Socket	7½d.	8¼d.	10¾d.	1/2	1/6¾	2/0¾	2/11½	,,

G.F. RAILING FITTINGS. Galvanized.

		1″	1¼″	1½″	2″	
Elbows	660	2/–	3/4¾	4/–	6/–	each
Tees	662	2/2½	3/8½	4/7¼	6/7¼	,,
D. Tees	663	3/–	4/6	6/–	7/9½	,,
Crosses	664	3/–	4/6	6/–	7/9½	,,
D. Crosses	665	3/3½	5/–	6/6	8/–	,,
Elbows	700	7/6	10/–			,,
Tees	702	8/6	11/–			,,
Crosses	704	9/6	13/–			,,
Knobs	730	2/–	2/6	4/–	5/–	,,

Complete Price Lists of G.F. Malleable Pipe Fittings for Gas, Water, Steam, etc., on application. *See Agents Advt., p. 6.*

LEAD PRODUCTS.

Subject to Market Fluctuations.

(April, 1938, Quotations.)

Sheet Lead—Cut pieces, 3lb. to 8lb., 40/–; 2½ lb., 41/6; 2lb. per sq. ft., 42/– per cwt.

Flush Pipes (Lead, complete with cap and lining)—

	5′	5′ 6″	6′	6′ 6″	7′	
1¼″	6/6	7/–	7/6	8/0	8/6	each
1½″	7/3	7/9	8/3	8/9	9/3	,,

Tin Lined Lead Pipe, 75/6 per cwt.
Tin Washed Lead Pipe, 55/3 per cwt.
Compo. Pipe. Coils, ⅜″dia., and over, 54/3; under ⅜″ dia., 58/3 per cwt.

Block Tin Pipe, 4/8 per lb.

Sheet Tin, 4/10 per lb.

Lead Dampcourse.	4½″	9″	14″	18″ wide
2lb. 20 ft. rolls	5/–	10/–	15/6	20/– each
3lb. ,, ,, ...	7/6	15/–	23/3	30/– ,,
4lb. ,, ,, ...	10/–	20/–	31/–	40/– ,,

30ft. rolls are supplied at 50% on above prices.

Note: Any piece of lead longer than 7ft. 6in. and 18in. or less in width is supplied and charged as Dampcourse.

Lead Centre Dampcourse.	4½″	9″	13½″	18″ wide
1lb. centre 20ft. rolls ...	5/–	10/–	15/–	20/– roll
1½lb. ,, ,, ,, ...	6/3	12/6	18/9	25/– ,,
2lb. ,, ,, ,, ...	7/6	15/–	22/6	30/– ,,
3lb. ,, ,, ,, ...	10/–	20/–	30/–	40/– ,,
4lb. ,, ,, ,, ...	12/6	25/–	37/6	50/– ,,

Lead Traps	Ord.	6″	9″	12″	18″	24″ Extra
"S" 1-1/4″	3/6	4/6	5/2	5/7	6/8	8/1 each
1-1/2″	5/2	5/10	6/5	7/–	8/2	9/1 ,,
2″	6/3	7/9	8/4	8/11	10/7	11/8 ,,
"P" 1–1/4″	3/2	4/3	5/–	5/4	6/2	7/5 ,,
1–1/2″	3/9	4/9	5/4	5/10	7/–	8/1 ,,
2″	5/2	6/3	7/6	7/8	9/4	10/6 ,,

Lead Pedestal Traps.

	Ord.	6″	9″	12″	18″	24″ Extra
1–1/4″ ...	10/1	11/2	11/11	12/4	13/6	14/10 each
1–1/2″ ...	12/10	13/7	14/2	14/10	16/–	17/– ,,

	1¼″	1½″	2″	3″	4″
Running Traps X. ...	3/2	3/9	5/1	11/4	20/– each
Bag Traps X. ...	4/7	6/11	9/5	—	— ,,

Lengthened Tails on Traps, per extra 6in., 1¼in. and 1½in., 1/4; 2in., 1/7.

Recipe to make Plumbers' Soil for keeping solder line on pipes when making them. **Soil,** for wiping joints, take ½ oz. pulverised glue, dissolve in water, gradually add a pint of lamp black with water to bring the whole to the consistency of cream. Boil and stir slowly.

Test.—Paint a little of the soil on pipe, if it comes off with a smart rub of the finger easily, add more glue till it sticks and takes a slight polish.

COST OF W.C. LEAD SEWER SOIL PIPE, MATERIAL AND LABOUR, per foot.

	£	s.	d.
10ft. run 4in. x 7lbs. lead soil pipe, weight 76lbs., at 53/6 per cwt., allow waste, 2½ per cent.	1	17	3
4lb. solder, 8/–; nails –/6	0	8	6
Labour, fixing, 22/–; lead tacks and sundries, 2/– = 24/–. Add for profit—10/–	1	14	0
8/– per 1 ft. ... ... 10ft. run, net cost	£3	19	9

SANITARY.

SOIL PIPE & FITTINGS.

Soil Pipe $\frac{3}{16}$″	2″	2½″	3″	4″	
2 feet Socket & Spigot	7/–	7/9	8/3	10/3	each
3 ,, ,, ,,	7/6	8/9	9/3	11/9	,,
4 ,, ,, ,,	8/6	9/6	10/3	13/–	,,
6 ,, ,, ,,	11/6	13/–	14/–	15/3	,,
6 ,, with 2 sockets	14/6	16/9	18/3	19/3	,,
Inspection Doors to above	5/9	5/9	5/9	11/6	,,
Bends W/– Air Vent				10/–	,,
,, W/– Heel Rest	6/9	7/–	7/9	8/3	,,
Bends & Elbows	3/6	3/9	4/6	6/3	,,
Inspection Door to Above	4/3	4/6	4/6	5/6	,,
Junctions Plain	4/–	7/3	7/6	9/6	,,
,, Unequal		6/6	7/3	10/–	,,
,, Inverted	7/–	7/6	8/3	11/–	,,
Double Junctions Plain	8/6	9/3	10/3	16/3	,,
,, ,, Unequal		9/9	10/3	16/3	,,
Inspection Doors to Above	4/3	4/6	4/6	5/9	,,
Double Sockets	2/–	2/3	3/–	3/6	,,
Reducing Sockets		6/–	6/–	6/–	,,
Shoes	2/9	3/3	3/9	7/6	,,
Patent Slip Joints	15/–	16/3	17/3	20/–	,,

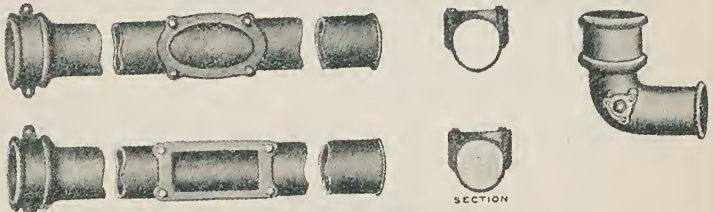
	9″	12″	15″	18″	24″
4″ Sanitary Branches P. Trap	12/–	12/3	12/9	13/3	19/6
,, ,, ,, S. ,,	18/6	19/–	19/6	25/6	26/9
Inspection Door to Above	6/–	6/–	6/–	6/–	6/–
4″ Short Connecting Pieces	7/–	7/3	7/6	7/9	9/9

Soil Pipes ¼″	4″	5″	6″	
2 ft. Socket & Spigot	11/6	13/–	18/9	each
3 ,, ,, ,,	12/9	14/9	20/6	,,
4 ,, ,, ,,	14/6	19/6	27/9	,,
6 ,, ,, ,,	19/–	23/6	32/–	,,
6 ,, W/– 2 sockets	25/3	30/3	38/–	,,

Pipe Clips, 3/–. Mica Vents, 6/–. No. 55 Soil Pipe Vent, 7/3.

All above pipes and fittings can be supplied Glass Enamelled inside, plus 50% on above prices.

SOIL PIPES



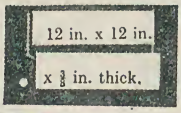
SOIL PIPE WITH SPECIAL TEST DOOR
in 6, 5, 4, 3, 2½ inch Diameter x 6 ft. long

SINGLE BRAN

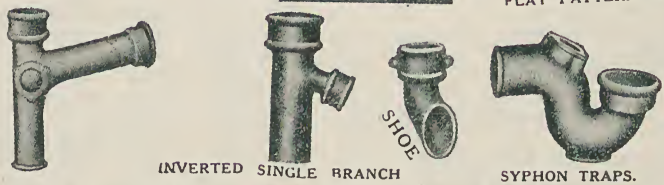
DOUBLE

SWAN NECKS
OR OFFSETS

INSPECTION DOOR COVER



FLAT PATTERN DOUBI



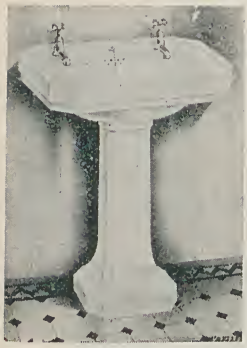
INVERTED SINGLE BRANCH

SANITARY BRANCHES

SYPHON TRAPS.
With Socket for Earthenware.

SANITARY BRANCHES INVERTED DOUBLE

PIECES FOR JOINING
EARTHENWARE TO IRON PIPES.



No. 5078—Bellevue.

FOWLER'S EARTHENWARE.

for the Bathroom, Lavatory & Kitchen.

R. Fowler Ltd.

Manufacturers of Clayware, since 1837.

Potteries, Marrickville, N.S.W., Thomastown, Vic.

PEDESTAL LAVATORY BASINS.

(Price List, June, 1938.)

No.	Note—Pillar Cocks & Plugs and Washers are Extra.		
5078	Octagonal Design, Bevelled Finish ...	24 x 20	125/– ea.
5040	Oval Basin, Sq. Base Pedestal ...	27 x 19	123/9 ,,
5041	F.B.S.F. Basin ,, ,, ...	22 x 16	89/6 ,,
5044	Corner Basin, Mitre Front, Cir. Base	27 x 20	110/3 ,,
5045	Oblong Flat Top Basin, Sq. Base Ped.	26 x 20	144/6 ,,
5046	F.B.S.F. Basin. ,, ,,	25 x 18	103/3 ,,
5047	,, ,, ,, ,,	27 x 19	123/9 ,,
5052	Marrick. F.B.S.F. Bev. Edges ...	22 x 16	89/6 ,,
5053	,, ,, ,, ,, ...	25 x 18	110/3 ,,

FOWLERS EARTHENWARE LAVATORY

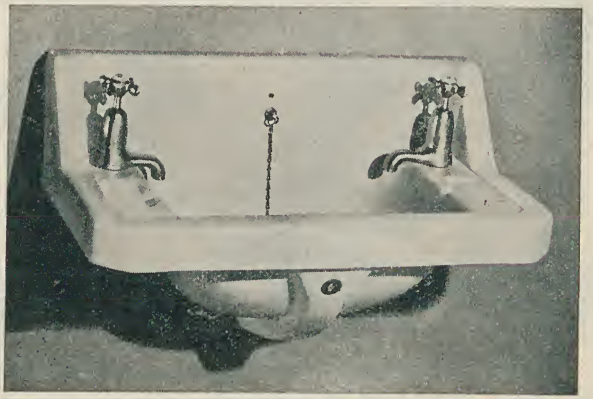
Corner Basins.

5022	Mitre Front	20 x 18	24/9 ea.
5023	Oval ,, ...	20 x 18	27/6 ,,
5024	,, ,, ...	20 x 18	24/9 ,,
5025	,, ,, ...	20 x 18	26/3 ,,
5026	Mitre ,, ...	25 x 19	34/3 ,,
5027	,, ,, ...	20 x 18	23/3 ,,
5103	Clarence Mitre Front	25 x 19	41/3 ,,

N.P. Plugs & Washers for above Basins, 5/6 each.
Pillar Cocks—Prices on Application. *See Advt., p.* 17.

FOWLER EARTHENWARE LAVATORY.
WALL BASINS.
Flat Back.

5030/32	Square Front	... ...	22 x 16	34/6 ea.
5031/77	,, ,,	... ...	20 x 16	31/6 ,,
5037/39	,, ,,	... ...	27 x 19	68/9 ,,
5055/56	Round ,,	... ...	22 x 16	34/6 ,,
5057	,, ,,	... ...	25 x 18	55/– ,,
5058	,, ,,	... ...	16 x 16	24/9 ,,
5059	Marrick Sq. Front	... ...	22 x 16	34/6 ,,
5076	,, ,, ,,	... ...	25 x 18	55/– ,,
5060	Tambo ,, ,,	R. E.	22 x 12½	33/– ,,



FOWLER'S EARTHENWARE LAVATORY SUITES.

No. 5356 "Marrick" Low Down Combination Suite.

S. or P. Trap, Vented, White, 134/– each.

Do. Do. Coloured, 225/9 each. Seats Extra.

5369 Marrick "Syphonic" Combination Suite.

S. or P. Trap White, 142/3 ea.

Do. Do. Coloured, 240/6 ea.

Seats & Connection Pieces Extra.

FOWLER'S PEDESTAL PANS.

5365 " Dulwich " All White ... 32/3 ea.
5566 " Campsie " Cane & White ... 30/3 ,,
5576 " Belmore " Ivory ... ... 30/3 ,,
5435 " Factory " Pans w/– Wood Slips C. & W. ... ... 48/– ,,
5473 " School " ,, ,, C.& W. 44/9 ,,

FOWLER'S EARTHENWARE SLOP HOPPERS.

No. 5608 All White with wood Strip insert and N.P. Grate, S. or P. Trap, 165/3 ea.

See Manufacturers Advt., p. 17.

LAVATORY SEATS.

4 pce. Tas. Oak S/F	5/6	D/F	10/6 each
,, Cedar S/F	11/6	,,	17/6 ,,
2 ply White Duco	22/6	,,	33/– ,,
Duperite (Black)			35/6 ,,

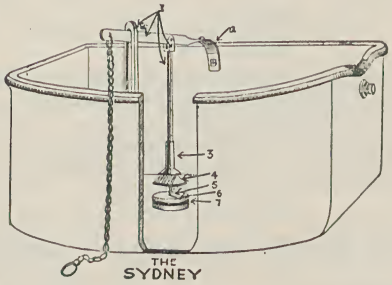
Fowler Enamelled Fireclay Urinal Stalls. " Continuous Channel type," **complete** with Fireclay treads, dividing piers, N.P. Dome Grate, Earthenware Automatic Cisterns, N.P. Sparge pipes, C.I.P.E. cistern brackets :—

1 person	19	16	6
2 ,, ...	38	18	8
3 ,, ...	57	13	4

4 stall and upwards—Prices on application. *See Advt., p.* 17.

Cisterns (Lavatory) " Sydney " Concrete, 28/–.

Replacement Fittings. Sydney Valve for Concrete Cisterns, 2 gall., 8/6 ea. Ditto for Murphy or Foreman's, 12/6 ea.



Cisterns National Cast Iron 2 gallon Painted, 30/– ea.
3 ,, ,, 34/– ,,
Cisterns Monarch, Painted, 37/6. Glass Lined, 51/–.

FOWLER'S EARTHENWARE CISTERNS.

Item No.	Description.	Flushing Capacity.	Price each.
5497	High level, fitted with syphon, pull chain and ball cock	3 Gal.	89/3
5508	Automatic, fitted with automatic syphon flush and ball cock	1 Gal.	66/9
5509	Automatic, fitted with automatic syphon flush and ball cock	2 Gal.	71/6
5510	Automatic, fitted with automatic syphon flush and ball cock	3 Gal.	84/3
5511	Automatic, fitted with automatic syphon flush and ball cock	4 Gal.	106/3

FOWLER'S EARTHENWARE SINKS.

5600/1 Kitchen Sinks with or without o/flow 18″ overall 35/9 ea.
5603/4 ,, ,, ,, ,, ,, 21 ,, 42/6 ,,
5605/6 ,, ,, ,, ,, ,, 24 ,, 49/– ,,
Plugs and Washers (Extra), 7/6 ea.

FOWLER'S ENAMELLED FIRECLAY SINKS.

Belfast Pattern—White & White—With or without O/Flow, Centre, Back or End Outlet.

24 x 16 x 8	62/6 ea.	27 x 18 x 8	79/9 ea.
24 x 18 x 8	72/3 ,,	27 x 18 x 10	102/9 ,,
24 x 18 x 10	90/3 ,,	30 x 18 x 8	90/3 ,,
24 x 20 x 10	101/9 ,,	30 x 18 x 10	115/6 ,,

Plugs and Washers, 7/6 each.
Also available up to 48 inch.
Further particulars on application. *See Advt., p.* 17.

BATHS & GAS COPPERS, ETC.

C.I.P. Enam. Baths 5′ 6″ Flanged White, £7/17/6. Ditto Stainless, £9/–/–.
5′ 6″ Rolled Edge, White, £7/4/–. Ditto Stainless, £8/10/–.
Also supplied 5ft. and 6ft. refer Advt., p. 2, 22, 36.
Coloured Baths are extra.
Concrete Baths 5′ 6″ on legs, 50/– ea.
Gas Coppers With Mottled Enam. Top & Lid.
Plain 12G., £3/7/9. 14G., £3/11/6.
With Draw off tap, 12G., £4/–/–. 14G., £4/4/9.
Refer Advt., p. 22.

DOORS & FRAMES FOR BUILT IN COPPERS.

	2	3	4	5
Complete W/– Grates	3/1	3/4	3/10	6/2 ea.
Grates Only	1/4	1/5	1/9	3/3 ,,

Dampers 12 x 10, 10/– ea.

FLUSHERETTE STORAGE TANKS.

Fibro Cement, complete with Tray Silent Ball Cock, Lid, 1½" outlet and overflow.

10 gal., 35/6. 20 gal., 42/9. 30 gal., 50/–. 40 gal., 64/– ea.

Flush Valves. Complete with Control Valve.

"Pubco" N.P.	...	60/–	Chrome	...	65/–
Hush N.P.	... ...	60/–	,, ...	...	65/–
Stanway N.P.	... ...	40/–	,, ...	...	45/–

Refer Advt., pp. 2, 22, 36.

ESTIMATE FOR WATER CLOSET.

	£	s.	d.
Pedestal Closet, white, £1/12/6 ; maple seat, single flap, 12/6	2	5	0
2 gal. Cistern, cast iron, 30/– ; 1½in. Flush Pipe lead, 9/–	1	19	0
½in. Ball Stop Cock, 5/9 ; 12ft. ¾in. Connecting Water Pipe at 5d.	0	10	9
12ft. of 2in. Vent Pipe, fixed at 5d., 5/– ; Ventilating Cowl, fixed, 3/6	0	8	6
	5	3	3
Plumber's Labour	4	0	0
Approximate net cost	£9	3	3

If on 1st floor, add for cast iron and lead soil pipes, &c., with extra labour.

Draining Boards (Terrazzo), 4ft. x 1ft. 6in., with 18 x 12 hole, 25/–. Special sizes extra.

Draining Board and Sink Combined, Aluminium, from £6 ; Cast Iron, Enamelled, from £3/10/–.

LABOUR ONLY.

Bath, fixing with waste and fitting with water and labour.—Ground floor, £3 ; first floor, £4 10s. With extra water and water pipes, £7 to £9

Basins, wall or pedestal, from £3/10/–.

W.C., ground floor, from £4.

Pan, fixing, Cistern and Concrete Drain Pipe, floor level, first floor, £8.

W.C., fitting up throughout, labour and materials, average price and goods, including pan, cistern waste and seat, £25.

Fixing 4ft. Urinal "Stall," single waste, from £7 ; two wastes, £9.

Fitting Gas Heater, labour only, with flue to ceiling, £2/10/–.

Labour fixing fittings, bath and kitchen ; Rails and glass shelves, each, from 5/–. Pedestal, four seats, from 7/– each. Bath Heaters, gas, from £4/10/–. Chip Heaters, with flue, £2/15/–. Gas Stoves, for water and gas pipes, ready to join on, from £6.

SEAMLESS COPPER BOILERS.

Prices are now as under, but are subject to alteration without notice. (April, 1938)

	Dia. in.	Depth in.	Light s. d.	Medium s. d.	Heavy s. d.
10 gallon	18½	13¾	25 9	27 9	37 0
12 ,, ...	19⅝	14	27 9	31 6	42 3
14 ,, ...	21	15	31 6	37 0	49 6
16 ,, ...	21⅝	15¼	39 9	45 6	60 9

See Advt., p. 22.

BATHS.

(Trade Price).

	5ft.	5ft. 6in.	6ft.
Galv. Iron—			
Malley's Special, on legs, 24G.	31/9	31/9	34/4 each
Beaded, flat bottom, 26G. ...	24/–	28/6	30/9
Beaded, flat bottom, 24G. ...	28/6	31/9	35/3

Cast Iron Painted, 5ft. 6in., only, 95/6.

30 x 20 x 10 Fireclay sink, £6/13/6 ; 17½ x 20 x 7 Fireclay Slop Hoppers with N.P. Hinged Bucket Stand, £10/11/3 ; Fireclay Pedestal Pans full front Box Rim, £2/19/– each.

BATHROOM FITTINGS.

Towel Rails (Nickel Plated), 24 x ⅝, 5/6 ; 30 x ⅝, 6/3 ; Opal, 30 x 1, 14/3 ; 36 x 1, 16/–.

Glass Shelves, with N.P. Brackets, 15/–, 17/6, 20/–.

Soap Dishes, 5/– upwards.

Bath Seats—Plain Polished, 11/6. White Duco, 14/– ea.

Bath Heaters. Gas. W/– Safety Interlocking Taps, etc.

Metters " Hunter " **N/plated** with shower, £5/16/–. **No shower,** £4/17/–.

Malleys " Sunrise " Chrome plated with shower, £5/17/6. **No shower,** £4/17/6.

Harfords " Revel " C/Plated, with shower £5/19/6. **No shower,** £4/17/6.

Gas Bath Heaters are now made in Porcelain Enam. in various Colours to tone in with modern coloured bath rooms. Prices range from £9/12/6 without shower, and £10/15/– complete with showers.

See Advts., pp. 2, 22, 36.

Closets, for non-sewered Situations, " Igene," and Farmers' Sanitary Pan, Dry earth closet, £3/15/– and £5/–/–.

Cover and seat for dry earth closet, enamelled, 20/– to 22/6. including gal. iron cylinder with seat.

Sanitary Combinations—

Complete with 6ft. Vent Shaft and Cowl (provision made to remove Pan at back, 41/3 each.

No odour, with fixed seat and flap, round cover, from 10/6 upwards.

Copper Down pipes, 2″ dia., 24G., 7/2 per 6ft.
4″ x 3″ x 24G., 14/1 ; 6″ x 4″ x 24G., 26/3 per 6ft. length.
Rain water head, 18″ copper, £7 ; 400 gallon corrugated copper, £22 2s.
1lb. copper flashing, 12in. wide, 13/– per 6ft. length.
Monel metal flashing, 6in. wide, 35/– per 6ft. length.
4″ Copper vent stacks, 12/8 ; 5″ Copper vent stacks, 15/9 per 6ft. length. 4″ copper cowl vent, 8/6 ; 5″ 16 oz. copper sewer control, 27/– each.

Note. Prices for Copper Goods are only Approximate—Fluctuate according to Metal Market.

SHOWER.

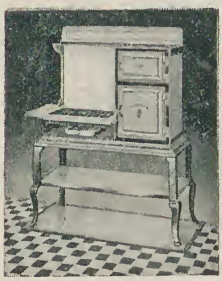
" Paragon " Bath, spray and shower, glass screen ... £37 to £55.
Copper Shower Heads, for fixing over baths—

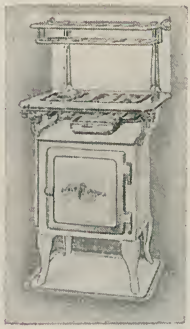
6in.	7in.	8in.	9in.	10in.
2/6	3/6	4/–	7/–	10/6

Bath Screen, to fix on rim of bath, gal. iron, 1in. corrugated, 5ft. high x 2ft. 6in., 73/6 ea.

COOKING STOVES.

(Gas & Fuel)





New Suburban Gas Stoves, partly mottled **with Plate Rack,** coloured enamel finish, £10/1/3 ea. **No Rack,** £8/15/6.
Standard Mottled, £10/11/9 ea. **No Rack,** £9/6/–.
Early Kooka No. 12 Do. Mottled Enamel, £14/2/6 ea. **No Rack,** £12/15/6.
Chrome Finish, £17/16/6 ea. **No Rack,** £15/10/–.
Success No. 11. Partly mottled enam. finish, with plate rack, £10/1/3. **No Rack,** £8/15/6.
Gas Rings. 3/3 upwards.
Bega Fuel Stoves. £3/17/6 to £7/–/–.
(for wood and Coal)
Younger (for wood & coal). £7/10/– to £11/15/–.
Dover. £4/5/– to £7/10/–

Portable Copper Frames.

	10	12	14	16	
Steel	28/6	29/6	30/6	32/9	ea.
No. 1 Cast ...	57/6	59/6	65/6	69/–	,,

For price of Copper Boilers to fit above frames, *see p.* 2, 22, 36.

HOT WATER

HOT WATER FITTER.

The Combined System is the cylinder and the storage tank system in one. The combination is claimed to overcome dangerous conditions which might arise if the tank system was emptied when the water supply failed. It also produces a better flow at the high taps. The reverse is sometimes associated with the cylinder system when used alone.

It is important that the tank be not too small, overheating is liable to occur, causing a noise and backing the hot water into the cold water pipes.

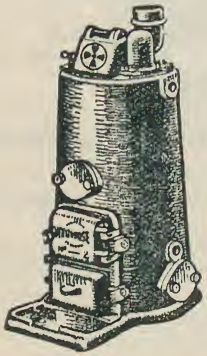
DOMESTIC BOILERS.

IDEAL DOMESTIC BOILER PRICES.

Number.	B.T.U.	gallons per hour. 50°-120°	50°-140°	Price
4D Rustless	38,500	55	43	£10 14 6 ea.
5D ,,	49,500	70	55	£18 3 0 ,,
6D ,,	66,000	94	74	£23 2 0 ,,
14D ,,	99,000	141	110	£35 4 0 ,,

See Advt., pp. 2, 22.

PRICES OF WHITE ROSE DOMESTIC BOILERS, 1938.



B.T.U.	Rustless	Plain	Tools
30,000	£12 7 6	£9 7 0	5/6
50,000	£18 3 0	12 2 0	5/6
70,000	£23 2 0	15 8 0	5/6
100,000	£35 4 0	23 13 0	16/6

Damper Regulator, £4/10/–; Straight Thermometer, 10/–.

See Agent's Advt. p. 36.

48 gallons hot water cost 1 penny.

To prevent overheating of the water, automatic regulation of the draught doors is used to advantage.

COPPER STORAGE CYLINDERS.

30lb. Pressure Test.

20 gall.	...	...	£6	3	6	60 gall.	...	...	£11	15	0
25 ,,	...	...	6	15	0	70 ,,	...	...	13	19	0
30 ,,	...	...	7	5	0	80 ,,	...	...	15	1	0
40 ,,	...	...	9	2	6	90 ,,	...	...	17	6	0
50 ,,	...	...	10	3	0	100 ,,	...	...	18	10	0

See Advts., pp. 2, 22, 36.

HOT WATER STORAGE TANK CAPACITY.

The following table for determining the size of the Storage Tank necessary for a hot water supply apparatus is the result of practical experience; the quantities of water may, however, vary according to local conditions, for which due allowance must be made.

Temperature	100deg. F. Gallons.	125deg. F. Gallons.	150deg. F. Gallons.
For a bath	50	33.3	25.0
For each Tap for washing purposes in Flats	5	3.3	2.5
Ditto in Hotels	20	13.2	10.0
For a lavatory Basin	5	3.3	2.5
For a Shower-bath	9	6.0	4.5

COPPER TANKS.

16 ounce—24 Gauge.

Approx. Capacity.	Diameter of Tank.	Height of Tank.	Tanks Complete less fittings.	Tanks less Lid & Fittings.
20 Galls.	1ft. 6in.	2ft. 0in.	£2/8/4	£2/0/6
30 ,,	1 ,, 9 ,,	2 ,, 0 ,,	£3/0/10	£2/10/8
40 ,,	2 ,, 0 ,,	2 ,, 0 ,,	£3/5/2	£2/13/5
50 ,,	2 ,, 2 ,,	2 ,, 1 ,,	£4/0/11	£3/4/9
60 ,,	2 ,, 4 ,,	2 ,, 1 ,,	£4/6/–	£3/10/4
80 ,,	2 ,, 9 ,,	2 ,, 1 ,,	£5/9/7	£4/5/7
100 ,,	3 ,, 2 ,,	2 ,, 1 ,,	£6/8/1	£4/15/–
150 ,,	2 ,, 9 ,,	4 ,, 2 ,,	£8/1/10	£6/14/2
200 ,,	3 ,, 2 ,,	4 ,, 2 ,,	£8/7/4	£7/14/3

No Connections are included in the above prices.

Refer Advts., pp. 2, 22, 36.

INSULATING MATERIALS.

Asbestos Cord $\frac{1}{8}''$ to $\frac{3}{4}''$, 2/4 pound. Asbestos Rope $\frac{1}{2}''$ upwards, 4/4 pound.

Asbestos Lagging, 13/3 cwt. Do. 85% Magnesia, 18/9 per Bag of 40 Pounds.

Hair Felt (Sheets) 34″ x 20″ x $\frac{3}{8}''$, 3/4 sheet, $\frac{1}{2}''$ at 3/7 sheet.

,, ,, in strips 36 feet x 2 inch, 2/5 strip.

Refer Advts., pp. 2, 22, 36.

Gate Valves. Gun Metal.

$\frac{1}{2}''$	$\frac{3}{4}''$	1″	$1\frac{1}{4}''$	$1\frac{1}{2}''$	2″	$2\frac{1}{2}''$	3″
6/2	7/9	9/–	12/–	15/6	19/9	45/–	56/– ea.

Wheel Valves. Gun Metal.

½″	¾″	1″
4/–	5/–	7/– ea.

See Advts., pp. 2, 22, 36.

HOT WATER.

Automatic oil burning Water Heaters, Duo Therm.

Model	Storage galls.	Heating Gall. Hr.	Price (ex store)
00 Copper	nil	20	£25 0 0
0 ,,	nil	40	£28 0 0
A ,,	25	15	£32 0 0
B ,,	40	20	£42 0 0
C ,,	60	45	£52 0 0
21 Steel	23	15	£37 10 0
41 ,,	45	35	£55 10 0

Models 00 and 0 designed for connection to separate or existing hot water storage. Models A, B, C, 21 and 41, combine burner, boiler and storage units ready to connect to hot water reticulation.

COPPER TUBES.

It is impossible to quote firm prices as quotations for this product are governed entirely by the fluctuations of the metal market.

Prices on application, see Advts., pp. 2, 22, 36.

Regular Stock Sizes.

Outside Diameter.	To Screw.	Approx. Weight per foot.
½″ x 18G.	¼″ iron.	.26
⅝″ x 14G.	⅜″ ,,	.53
16G.	⅜″ ,,	.43
18G.	⅜″ ,,	.33
*3/16″ x 13G.	½″ ,,	.81
14G.	½″ ,,	.71
16G.	½″ ,,	.58
1″ x 16G.	¾″ ,,	.72
18G.	¾″ ,,	.55
*1 1/32″ x 13G.	¾″ ,,	1.05
14G.	¾″ ,,	.92
16G.	¾″ ,,	.75
1¼″ x 14G.	1″ ,,	1.14
16G.	1″ ,,	.92
*1 9/32″ x 12G.	1″ ,,	1.49
*1⅝″ x 12G.	1¼″ ,,	1.92
14G.	1¼″ ,,	1.50
16G.	1¼″ ,,	1.21
*1⅞″ x 12G.	1½″ ,,	2.21
14G.	1½″ ,,	1.74
*2 5/16″ x 11G.	2″ ,,	3.12
12G.	2″ ,,	2.79
14G.	2″ ,,	2.16
16G.	2″ ,,	1.74

**Water Board Standards.*

WROUGHT-IRON PIPES, PER FT. COPPER PIPE.

Bore Ins.	Thickness of Iron. in. 1/16 lb.	in. 1/8 lb.	in. 3/16 lb.	in. 1/4 lb.	in. 5/16 lb.	The Weight of a ft. in length. Thickness. Bore.	in. 1/16 lb.	in. 1/8 lb.	in. 3/16 lb.	in. 1/4 lb.
3/8	.3	.7	1.1	...	...	1/2 in.	0.42	.94	1.60	2.27
1/2	.4	.83	1.4	2.0	...	5/8	0.52	1.14	1.79	2.65
5/8	.46	1.1	1.6	2.3	3.1	3/4	0.62	1.33	2.17	3.02
3/4	.54	1.2	1.9	2.6	3.5	1/2	0.7	1.51	2.45	3.40
7/8	.6	1.3	2.1	2.9	3.9	1	0.80	1.69	2.73	3.77
1	.7	1.5	2.4	3.3	4.3	1 1/4	1.00	2.08	3.29	4.50
1 1/4	.87	1.8	2.9	3.9	5.2	1 1/2	1.15	2.42	3.85	5.30
1 1/2	1.0	2.1	3.3	4.7	5.9	1 3/4	1.40	2.87	4.48	6.08
1 3/4	1.2	2.5	3.8	5.3	6.8	2	1.56	3.21	5.00	6.80
2	1.4	2.8	4.3	5.9	7.6	2 1/4	1.74	3.58	5.56	7.55
2 1/2	1.7	3.5	5.3	7.3	9.3	2 1/2	1.94	3.97	6.14	8.31
3	2.03	4.1	6.3	8.6	10.9	2 3/4	2.09	4.34	6.73	9.12
3 1/2	2.34	4.7	7.3	9.8	12.5	3	2.27	4.78	7.30	9.82

Lead required to Caulk Iron Spigot and Socket Pipes—lbs. per joint.

Interior Diameter of Pipe. in.	Length of Socket, inside measure. in.	Weight of Lead per Joint. lbs.	Depth of Lead in inches. in.
1 1/2	2 1/2	1 1/4	1 3/8
2	3	1 3/4	1 1/2
2 1/2	3	2 1/4	1 5/8
3	3	2 3/4	1 5/8
4	4	4	1 3/4
5	4	5 1/2	1 7/8
6	4	7	2

VENTILATING COWLS.

	2″	3″	4″	6″			
Sewerage—Galvd.	1/2	1/7	1/9	6/9	ea.		
,, Copper	5/–	7/–	8/6	—	ea.		
Down Draft—Galvd.	2/2	2/9	3/6				
Mica Induct ,,	2/6		2/6	6/3	,,		
H. Cowls ,,	3/8	4/3	4/6		,,		
	6″	9″	10″	12″	15″	18″	
Rainproof Cowls Galvd.	15/9	21/4	23/7	27/–	39/4	56/3	ea.
Sunrise Suction	14/–	19/–	—	25/–	55/6	63/–	,,
Bases	15/3	18/6	—	22/–	27/–	32/–	,,
Breach's Patent	25/9	33/9	—	47/–	70/–	85/–	,,
	4″	5″	9″	12″	15″	18″	
Zinc Princess Pat.	25/–	31/–	45/–	55/–	75/–	120/–	,,

Revolving Cowls. Malthouse 7″, 12/–. Lobster Back, 27/– ea.
Shafts Extra 3 feet, 10/3. 6 feet, 15/3 ea.
See Advt., p. 2, 22, 36.

ROOF-SLATER, TILER, SHINGLER

1938 Award Wages, $2/9^{7}/_{11}$ per hour.

SLATING, PER SQUARE.

Measurement, if not otherwise stipulated.

Take the net measurement of area covered.

Add the length of the eaves by 1 foot wide.

Add the length of all cuttings to hips, valleys, dormers, chimneys, etc., by 6 inches wide.

The battens generally specified, are 2in. x 1in. deal; if wider they are apt to curl up with the heat and lossen the slates.

Spacing.—Battens for slates and shingles require the same distance apart, centre to centre, that the width of slates exposed show when laid.

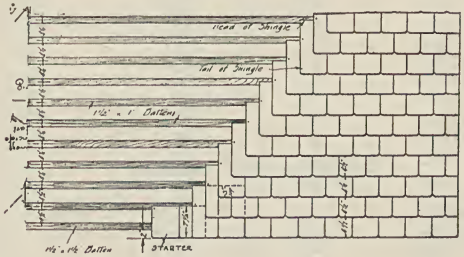
To find the number of battens to length of rafter:—The lap or cover of slates, etc., varies according to material used and pitch of roof to be covered.

The following table is reckoned for a 3½in. lap—that usually specified.

If the slates fit closely, 2½ inch lap is sufficient. The larger the lap the more the slates *cock up*. When the slates do not fit closely, the roofs require *pargetting* or *rendering* in lime and hair mortar.

Allowing that 2½in. lap is sufficient for a Gothic roof of 60 deg., then 3in. lap should be used for a square roof, 3½in. for a third pitch, and 4in. lap for a quarter pitch roof.

The *cuttings* next hips and ridges are generally bedded in mortar.



SLATES AND BATTENS REQUIRED PER SQUARE.

Laid with a 2½in. lap or cover.

Weight per square, about 6 cwt.

	Wt. per 1000 cwt.	Number required per sq.	Battens per sq. ft. run	Labour and Nails 3½ lap	Labour and Nails 4½ lap
Duchess, 24 x 12 ...	... 50	120	120	9/–	8/–
Countess, 20 x 10 ...	... $33\frac{3}{8}$	180	150	11/–	11/–
Viscountess, 18 x 10	... 30	208	175	12/–	10/6
Ladies, 16 x 8 ...	... $20\frac{7}{8}$	300	200	13/–	12/–

Eaves or cuttings to waste must be allowed for.

METHOD FOR FIXING SLATES ON ROOF.

Spacing battens for 24 x 12 slates, 10½ inch centres.
Spacing battens for 20 x 10 slates, 8½ inch centres.
Slates cut for bottom starters, 24 x 12 slates, to 13½.
Slates cut for bottom starters, 20 x 10 slates, to 11½.

Nail the top head of the slate half way on batten from bottom batten (for bellmouth), 2½ x 1½ on edge bevelled to roof.

Circular slating, one-third to one-fourth extra for labour, but for materials according to actual waste in radiating the sides, etc.

For **fancy cut slating,** reckon from one-third to twice more for the labour, which includes nailing on the battens.

For stripping roofs, reckon one-half the given prices, for " Labour and metal nails."

Rendering or pargetting slate joints, per foot run, about 2d.
Ditto do. in lime and hair mortar, per square, 10/–.
Bedding, Hips and Ridges, per foot run, 4d.

Cutting through slate roof for 4 inch gal. iron **vent pipe,** and making good with slates and lead apron, 10/–.

	s.	d.
Mitred slate hips, with " soakers " bedded, over waterproof felt...	1	6
If under-bedded with 2lb. lead soakers per foot run	3	0

METHOD FOR MEASURING.

If the roof is **plain and unbroken,** take the length of the longest eave, and multiply it by length of rafter, double for both sides of roof. Gables and hip roofs measure alike, but add extra for projection of gable ; also extra for the cutting of hips.

For broken roofs of the same pitch throughout, reckon the whole area as one roof, and allow extra for cutting valleys, hips, and ridges.

In irregular pitched roofs measure the eaves in sections, and multiply by the different lengths of the rafter above each section.

SLATES PER 1000.

The prices of slates vary according to tariff and supply. The Willunga blue roofing, size 18 x 9, £23 15s. ; 18 x 10, per 1000, 27/6. 20 x 10, 32/–. Small parcels, £2 extra per 1000.

N.S. Wales Slate Co. Ltd., Goulburn and Mudgee roofing slates, purple, grey, green and blue, price fixed in city or suburbs, £5 10s. J. Muir, Redfern.

Estimated cost of Slate Roof per square.

Willunga Slates, 20 x 10, at £32 per 1000—			
Slates, 180 per square	£5	15	0
Oreg. Battens, 150ft. run, 2 x 1 = 25 sup. ft. at 28/– ...	0	7	0
Nails, 9d. ; and 2lb. slate compo, nails, 1/6	0	2	3
Labour to slates and battens	0	10	0
Net	£6	14	6

" **Fibro** " **Roof Tiles**—

Grey, 16″ x 16″, per 1000...	£13	0	0
Material and Labour fixed per square	1	10	0
Brown, Blue and Red asbestos cement roof tiles, 16″ x 16″, fixed complete per square	2	2	0
Grey do. 20″ x 10″ at £10 10 0 per 1000 do.	2	10	0
Russet Red do. 20″ x 10″ £13 5 0 per 1000, **materials and labour fixed** complete per square ...	3	0	0

TERRA COTTA ROOFING.

This cheerful and picturesque roofing material is very suitable for our bright and warm climate, as it is much cooler than slates, although slightly heavier. It does not necessitate any alteration in the construction of roof supporting timbers.

The weight of Tiles (Marseilles pattern) is about 8 cwt. to the square when laid.

1000 Tiles weigh 3½ tons.

The shingle pattern tile is also made with fancy cut edges, suitable for ornamenting small roofs, over porches, dormer windows, balconettes, and projecting window shades.

It is not advisable to have the pitch of roofs too flat, owing to the collection of dust and moisture, which in course of time will discolour the tiles.

Material required.—Bedding : 100 feet run of Terra Cotta Ridge Tiling, fixing : 2 cubic feet lime and hair mortar. **Pointing up :** 1 cubic foot cement mortar and 2lbs. of red oxide for colouring.

Labour : Tiler, bedding and pointing 150 feet of run tile ridging and hips is 2 days.

ROOF TILING AND SHINGLING.

Terra Cotta Tiles (French pattern), weight 3½ tons per 1,000. Requiring 127 tiles per square. 1000 tiles cover nearly 8 squares. Requiring 90 feet run of 2 x 1 battens.

Sarking is a sure method of obtaining a completely water-tight tile, slate or shingle roof. It consists of a reinforced water-proof paper laid over the top of the rafters before the roofing battens are applied. It is also used extensively under iron roofs to carry off condensation which forms under the iron during winter. Can also be applied to an existing roof.

Agents recommend for this purpose—

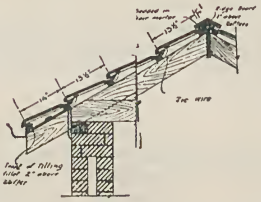
30/30 Grade Sisalkraft,	7/9	100 sq. feet.
60/60 ,, ,,	9/9	,, ,,
S-K Fibreen	14/–	,, ,,

See Advt., p. 14.

Terra Cotta Shingle Tiles, requiring 550 tiles per square. 280 feet run battens.

Glass Roofing Tiles, to match, Marseilles pattern, each 5/–.

T.C. Ridging.—Plain, per ft. 6d.; Crested, 1/–; Finials, from 8/– each; Starters, 1/6 each; Apex Pieces, 3/– each; Stop Ends, 2/– each; Close Hips, 2/9.



ROOFING TILES—PRICE SCHEDULE.

November, 1937.

Roofing Tiles and Accessories fixed within the County of Cumberland.

	Per Square £ s. d.
1. All Terra Cotta Tiles, light or dark red, including salt stained, but which are unglazed and not manganese stained	2 17 6
2. Glazed and semi-glazed red, brown or black or shades thereof, but excepting muntz or shades thereof... ... Note.—Where semi-glazed and unglazed, i.e., types 1 and 2 are combined in the roof, the rate of £3 per square must apply.	3 0 0
3. Mottled roof of classes 1 and 2, including up to 25% muntz, and/or shades thereof	3 3 0
4. Mottled roof of classes 1 and 2, including up to 15% muntz or shades thereof and up to 10% green and/or blue	3 5 0
5. Mottled roof of classes 1 and 2, including up to 50% muntz or shades thereof	3 5 0
6. Mottled roof of classes 1 and 2, including up to 40% muntz and up to 10% blue and/or green	3 7 0
7. Mottled roof of classes 1 and 2, including up to 100% muntz or shades thereof	3 9 6
8. Mottled roof of classes 1 and 2, including up to 90% muntz or shades thereof with and up to 10% blue and/or green	3 12 0
9. Nut green (not sprayed)	3 12 0
10. Mottled roof of classes 1 and 2, including up to 50% nut green (not sprayed)	3 7 0
11. Chocolate—manganese mixed in clay	3 10 0
12. Multi coloured up to 30% muntz and up to 20% of sprayed green and/or blue in conjunction with classes 1 and 2	3 9 6
13. Sprayed tiles—full roof, all green and/or blue	4 7 6

Any complete job under 6 squares, 5/– sq. extra.

Ridging and Accessories Extra :

	s.	d.	
Plain Ridging	1	4	ft.
Multi Coloured Ridging	1	6	,,
Sprayed Ridging—green or blue	1	8	,,
Chocolate Ridging	1	6	,,
Starters (not included in measurement of ridging) ...	2	6	ea.
Sprayed Starters do. do. do. ...	2	9	,,
Apex	3	0	,,
Sprayed Apex	3	6	,,
Gable Finial O.G.	7	0	,,
Half-round Ridging, diminishing or otherwise	1	9	ft.
,, ,, ,, Multi Coloured	1	11	,,
Sprayed ,, ,, ...	2	0	,,
Chocolate ,, ...	1	11	,,
Half-round Starters (not included in measurement of ridging)	5	0	ea.
Half-round Starters, sprayed (not included in measurement of ridging)	5	6	,,
Half-round Apex, diminishing or otherwise	5	0	,,
Half-round Apex, sprayed, diminishing or otherwise ...	5	6	,,
Roll Tile on the Verges—1 course	1	6	ft.
2 course	3	0	,,

Prices are Strictly Net.

Further information, *see Advts., p.* 1 *and inside of Back Cover.*

RAFTER LENGTHS.

Terra Cotta Tiles.

Courses	Rafter	Courses	Rafter	Courses	Rafter
1	1 $1\frac{5}{8}$	9	10 $2\frac{5}{8}$	17	19 $3\frac{5}{8}$
2	2 $3\frac{1}{4}$	10	11 $4\frac{1}{4}$	18	20 $5\frac{7}{8}$
3	3 $4\frac{7}{8}$	11	12 $5\frac{7}{8}$	19	21 $6\frac{5}{8}$
4	4 $6\frac{1}{2}$	12	13 $7\frac{1}{2}$	20	22 $1\frac{1}{2}$
5	5 $8\frac{1}{8}$	13	14 $9\frac{1}{8}$	21	23 $10\frac{1}{8}$
6	6 $9\frac{3}{4}$	14	15 $10\frac{3}{4}$	22	24 $11\frac{3}{4}$
7	7 $11\frac{3}{8}$	15	17 $0\frac{3}{8}$	23	26 $1\frac{3}{4}$
8	9 1	16	18 2	24	27 3

Weight per 1000, 3 ton, 4 cwt., 3 qrs.

Battens, 90 feet per square. 131 tiles per square.

SHINGLING.

Material per square.

Forest Oak Shingles, 15 x $3\frac{1}{2}$, 8 bundles cover 100 sq. feet. 90/– per 1000, will cover 100 sq. feet.

Redwood Shingling, 4 bundles cover 100 sq. feet, at 15/– per bundle = 60/–.

Number of Shingles a good tradesman should lay per day of 8 hours :—
Redwood Shingles on a roof, 2000 to 2500.
Shingles on walls, 1500 to 2000.

NUMBER OF SHINGLES OR SHINGLE TILES.

Required to cover a square, stating average width of shingle and length exposed to weather, or width of rows seen.

Width of Rows seen. Inches.	Width of Shingle. 4in.	6in.	1000 Shingles will cover ft. 4in. Shingle. sq. ft.	6in. Shingle. sq. ft.
4	900	600	110	168
5	725	485	140	210
6	605	405	167	250
7	515	345	195	292
8	451	306	225	335

Labour per square and Battens required.

	Labour.	Battens.
Metal Shingles, from	7/6	100
Slates, 20 x 10	10/–	150
Asbestos Cement Slates, diagonal ...	7/– to 10/–	150
Redwood Shingles	17/6	190
Oak Shingles, 15 x 3½	25/–	210
Shingle Tiles, Terra Cotta	22/6	190
Tiles, French pattern	7/6	90

Wall or Gable, add 30 per cent. for labour.
Half 5ft. Palings, 100 per square 8/–

SLATERS' AWARD, 1937.
Labour only, $2/9^{7}/_{11}$ per hour.
Slates punched ready.

Fibro Cement.	Labour laying. Per square. s. d.	Roofing Slates.	Per square. s. d.
16 x 16 diagonal ...	7 6	20 x 12	9 0
15 x 15 ,, ...	8 6	20 x 10	10 0
12 x 12 ,, ...	10 6	18 x 10	10 6
24 x 12 square ...	8 6	18 x 9	11 0
Rendering	2 6	16 x 10	11 6

Mitring hips, 20ft. and over, 1/3 ; under 20ft., 1/6.
Ridging, –/3 ; if punched on job, 1/6 per 100.
French tiles, every second tile wired, 7/6 per square.
Chocolate, semi-glazed, every second tile wired, 8/6.
Slate and Lead, glazed and wired, 9/6.
Cement tiles, labour per square, 10/6.
Shingle tiles, nailed at hips, caves, valleys and gables, 22/6 square.
Rendering, per square, 5/–.
Shingles, redwood, sawn on roofs, 17/6.
Oak, 25/– ; mitring, 1/– ; oak, 1/3.
Cottage work only, battens softwood, H.W. 1/– extra for all ·s above first, 1/– extra per storey.

GENERAL ROOFING ESTIMATES.

Labour and covers per square.

Galvanised Iron, at £30 per ton, or 30/- per cwt.—	£	s.	d.
1⅛ cwt. per square, 26 gauge	1	13	9
Labour, laying iron—7/-; screws and washers, 1/- ...	0	8	0
Oreg. Rafters, 2ft. spaced, 6—10's=60 ft. run, 4 x 2, at 38/- 100 super	0	15	3
Labour, cutting rafters and fixing battens, 6/- and nails, 9d.	0	6	9
3 x 1½in. battens, 2ft. 6in. apart=50 l. ft. at 40/- per 100 s. ft.	0	8	0
Gal. iron and rafters, net price	£3	11	9

Redwood Shingles, at 15/- per bundle, 4 bundles per square	£	s.	d.
Battens, 190 ft. run, 2 x 1, at 6/10 100 ft. run; nails -/6	3	0	0
Labour, shingling 17/6; battens, 3/6; nails, 2/6 ...	0	13	6
Net	1	3	6
	£4	17	0

Forest Oak Shingles	£	s.	d.
Shingles at 90/- per 1000—			
800 oak shingles to square	4	10	0
Oreg. Battens, 210 l. ft. to square 1½in. x 1in., at 5/6 100	0	13	9
Labour to shingles, 25/-; to battens, 4/-; nails, 3/6 ...	1	12	6
Net	£6	16	3
Add for Rafters and Profit.			

RAFTERS TO THE SQUARE.

Oregon Rafters, plain gable roof, spaced 18in. apart, 8—10's = 80ft. run, 4 x 2, at 38/- per 100 sup. ft.	£	s.	d.
	1	0	6
Labour, cutting, hauling and fixing, 8/6; nails 1/6 ...	0	10	0
Net	£1	10	6
Add extra for hips, waste and profit.			

Terra Cotta Tiles, French pattern, £15 per 1000—	£	s.	d.
Tiles, 130 per square, at 30/- per 100	1	19	0
Battens, 90ft. run, 2 x 1 oregon, 5/-; nails, 1/- ...	0	6	0
Labour to tiles, 7/6; battens, 2/6; 1lb. copper wire, 1/6	0	11	6
Net	£2	16	6
Rafters as above to be added	1	10	6
Net	£4	7	0

	£	s.	d.
Fibro-Cement and Asbestos-Cement Slates, 16 x 16in.—4in. lap, laid diagonally. 100 Slates (Greys) cover 1 square.			
100 slates at £21 per 1000	2	2	0
100 crampoons at 22/– = 2/3; clouts, –/6	0	2	9
150 ft. 2 x 1, and battens nails, spaced 7½ inches, 6/10 100	0	10	3
Labour to battens, slates and nails	0	10	9
Net	£3	5	9
Add for profit.			
Shingle Tile, 10½ x 6 x ½ thick Roof—			
550 tiles at £6 per 1000	3	6	0
280ft. run 1½ x 1 batten at 5/6 100ft. run	0	15	6
Labour, award	1	2	6
Nails	0	2	0
Net	£5	6	0
Add Profit, etc.	1	10	0
	£6	16	0

TERRA COTTA

Terra Cotta Lumber, having passed through 2,000 to 2,500 deg. Fahrenheit, is suitable for fire proof ceilings, floors, girder casing, column casing, and partitions. Absolutely **no shrinking,** and is fire and sound proof.

These hollow blocks are much lighter than solid brickwork; its crushing weight is 840lbs. per sq. in. It will also readily receive nails driven into it.

Partitioning Tiles (Liverpool Tile and Terra Cotta Co. Ltd.), 9 blocks to the square yard; 2, 2½, 3, 4, and 6 inches thick.

Light T.C. Bricks, hollow, 9 x 4½ x 3, weight 5lbs. each.

Terra Cotta Lumber partitions bond in with every three course of brickwork.

LUMBER WALLING, per square yard.

Size Thick	Price sq. yd.	Weight sq. yd.	Size of Block	Description	Labour and Cement.
ins.	s.	lbs.	in.		s.
2	3/6	120	12 x 6	Interlocking	3/6
2½	3/6	130	15 x 9¾	,,	3/9
3	3/9	155	,,	,,	4/–
4	4/6	190	,,	,,	4/3
6	5/9	250	,,	plain	5/3

FLOORING (material only).

6in. x 6in., 6/6 ; 8in. x 6in., 8/– ; 10in. x 6in., 9/– ; 12in. x 6in., 10/6 per sq. yard.

Add—

Centering, 2/– ; cement, 3 to 1, 1/– = 3/– ; **Labour,** laying, from 4/– per sq. yd.

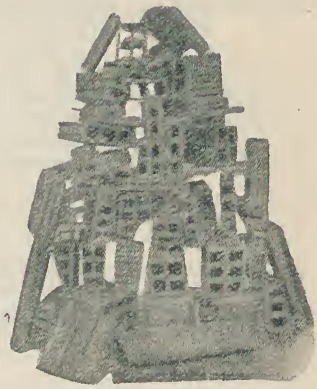
Add Cartage to work and hoisting, per floor.

Partition Bricks, 30/– to 40/– per 1000, at works.

Labour, laying, from 30/– per 1000.

Chimney Pots, red or buff, 10in. to 17in. high, 4/6 to 6/–.

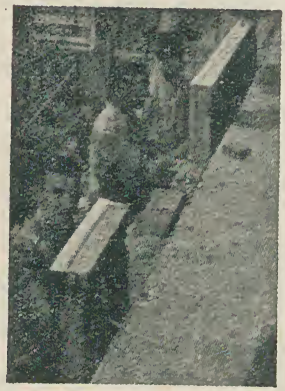
Ditto, Octagon, round and fluted, 22in. to 27in. high, 6/– to 7/6. Add extra for Windguard, 1/– ; Blowers, 1/8 ; V. Caps to pot, 3/– each. Glazed Earthenware Pots, similar designs and prices. Fixing cement and labour, 2/– extra.



ARCHITECTURAL TERRA COTTA.

This material is a mixture of special clays, which are burned to a high temperature, and usually carry a glaze on the exposed surface.

Such glazes may be either dull matt or lustrous, and may partake of almost any colour.



The Terra Cotta is used as a "facing" material for buildings and therefore assumes many forms, both plain and decorative.

Considered as ashlar, it may be described as blocks of burned clay, about four inches thick, hollowed out at the back, for cement key to wall, the block actually comprises face, horizontal sides, and ends, with intermediate ribs where necessary for strength. Less in weight than a solid facade.

In **designing** a **Terra Cotta Facing** to concrete building, it is desirable to limit the sizes of blocks to a maximum of about 24 to 36 inches long, by 12 to 18 inches high. Awkward projections and decorative pieces of irregular shape should be avoided. If sizes of blocks are standardised, a greater economy in manufacture will result, as less moulds will be needed.

In fixing, Terra Cotta is bonded with brickwork, or tied back to structural steel or concrete. The manufacturers usually supply working drawings, displaying full particulars of the fixing. *See* diagram, also "Ceramic" Brickwork Section. A detailed plan is necessary. Costs vary according to design and colour.

See pp. 1-19, *for advt. of makers.*

"FAIENCE" WORK.

Glazed Terra Cotta for Facing with Tiles, Concrete Buildings.

	s. d. sq. foot.
Wunderlich, 4 inches thick, from	15/– to 20 0
3 inches thick, plain face, from	10/– to 15 6

For repetition work only.

Add for Cartage, crane handling and haulage, and setting, mortar and pointing.

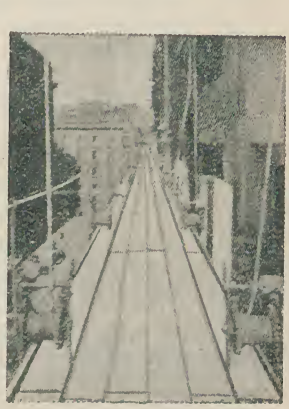
Insurance offices, Banks and Commercial Houses, Royal Exchange, &c. Australian made in imitation of fine granites, marbles, yellow to pink shell and fancy tints for facades.

Plain face work fixed from 20/– per sq. ft., according to weight.

SAFETY SCAFFOLD SOMETIMES USED FOR FACING CONCRETE BUILDINGS.

Extract from Truss Concrete Steel Job Book.

PATENT SUSPENDED SCAFFOLD AND WINCHES.



These are used for elevating a continuous platform for workmen when "**facing**" concrete constructions, and are hung with steel wire ropes from R.S. joists projecting at top of building.

Obtained on **Hire** per unit of 10ft.

First **unit** contains two winches to suspend a platform 5ft. wide. Double winches used for wide platforms up to 10ft.

Rental, 12/– per unit from agents, James Hardie & Co. Sydney and Melbourne.

This **scaffold** appeals to the builders as one of the necessary protections against accidents, and a help to safety and speed in working, especially on **facing** the modern tall concrete building with **safety.**

Particulars **Leasing** of scaffold only, from above Co., from 12/– per unit of 10ft. x 5.

See Accident Assurance of workmen advt., p. 26.

TILER

Labour only—Piecework Schedule.

Award 1937-8.

Floor and Verandah Tiling, etc.

	per sq. yd.
Tiles—3″ x 3″, 4″ x 4″, 6″ x 3″, 6″ x 6″ or larger	4/6
3″ x 3″, 4″ x 4″, 6″ x 6″, Octagon and dot... ...	4/9
1½″ x 1½″, 2″ x 2″	6/–
Moravian 2″ x 2″, 2″ x 1″ to 3″ x 1″	6/–
All other Patterns of Tiling...	6/–
Mosaic (Ceramics etc.) Hexagon w/– sq. border ...	5/6
,, ,, Round or square	6/–

General to above.

Curved or Splayed Places, 1/– per sq. yd. extra to above.
All areas under 5 yds., 15% additional to above.

Nosing Steps, etc.

Marble, Slate, or other Nosing, or Bordering for Porches, Verandah, etc.—5d. foot run.
Marble, slate or other steps with Tile Risers 7d. foot run.
Provided that all steps and risers four feet long and under shall be paid for at 1/9 for each step and 1/9 for each riser.
Glazed Steps and Risers, fixed with Round Edges 1/6 foot run.
Steps with Nosing and Tread Tiled ... ... 1/9 ,, ,,
,, ,, Riser, Nosing and Tread and Tiled... 2/6 ,, ,,
All Tile Steps, Risers etc., under 4 ft. long, 15% extra to above.

Wall Tiling. Areas of 9 sq. yds. or over. (White or coloured).

	per sq. yd.
6″ x 2″	6/3
6″ x 3″, 6″ x 6″ or larger (Bonded)	4/6
6″ x 3″, 6″ x 6″ ,, (Square Joint)	5/–
4″ x 4″ to 5″ x 5″ inclusive	5/3
3″ x 3″	6/3
Opalite or other Glass Tiling	
9″ x 3″, 6″ x 3″ (Broken Bond)	4/6
4″ x 4″ to 6″ x 6″ inclusive (sq. joints)	5/3
,, ,, ,, (Bonded)	5/–

If fixed with diagonal joint, 1/– per sq. yd. additional.
If 2 or more strips up to 2″ wide are inserted 2d. per foot run in addition to full overall measurement.
Areas under 9 sq. yards—15% additional to above.

Recesso Fittings etc.

Recesso, Soap Toilet or Basin	each	2/–
Soap and Toilet with Mitre Surrounds	,,	2/6
Recesses in walls tiled	,,	2/6
All other fittings—Except Vents		1/–
,, ,, ,, with Mitre Surrounds ...		1/6

LABOUR ONLY.

Moulded Tiles.

Angle Beads, Capping and Round Edge (but non-inclusive of round edge on top of walls) ...	2d. foot run
Internal and External Bonding Tiles	3d. ,, ,,
,, Cove Tiles up to 3″	3d. ,, ,,
Cove Tiles and Skirting	3d. ,, ,,
Skirting and Capping only when fixed on Walls ...	6d. ,, ,,
Cutting Glazed Strips up to 2″ wide	3d. ,, ,,

Cutting Mitres on Jobs.

External, 1/–. Internal, 9d. Three Way in Angle Beads, 1/– ea. These rates are additional to full overall measurements.

Dados.

	per sq. yd.
6 x 1, 6 x 1½	11/–
6 x 2	9/–
6 x 3	6/–
6 x 6 or larger	6/–
4 x 4 to 5 x 5 inclusive	7/–
3 x 3	9/–

Diagonal joints, 1/– per sq. yd. extra to above.

Hotel Fronts, Shop Fronts and Exterior Work.—All shop fronts and exterior work in tiling (except hotel fronts) inclusive of stall boards and piers, 1/6 per sq. yd. over and above the rates set out for Dados. Hotel fronts—a minimum rate, 8/3 sq. yd.

Built in Baths. 6/6 each. Hobs, 3/–. These rates do not include the building of brickwork.

Tiling with Open Joints. Where tiles are laid in any place whatsoever so as to have open joints around or between them 16⅔% extra on the rates for laying such tiles.

MATERIALS.

Tiles, English Wall (white), 6in. x 3in. x ¼ or 6in. x 6in., per sq. yd., 13/6 to 14/6 sq. yard.

Tiles, Opalite, 6in. x 3in., 8/– yd.

Tiles, coloured, 6in. x 3in., or 4in. x 4in., from 23/– to 35/– yd.

White Capping, 6in. x 2in., per ft. run, 1/6; stop-ends, angles, angle beads, 1/– per ft. run.

Tiles, Floor, unglazed, in plain colours, from 12/– per yd.

"**Terrazzo,**" made in concrete faced and rubbed smooth in marble chippings, red, grey and blue.

Threshold steps, 12in. wide, with nosing point edge.

Stock sizes 3ft. to 4ft., in 3in. increases, up to 4ft., 2/9 per foot run, 5ft. to 7ft., 3/3 per foot run, over 7ft., 4/– per foot run. Full return nosings, 1/– each.

Step Risers, "Terrazzo," up to 5ft., per ft. run, 1/8 foot run.

"Arkilite," "Ironite," "Metalite," Steps, a cement concrete surfaced material. Stock sizes, coloured red, grey, black 12in. x 1½in., per ft. run, 1/6 to 7ft. long.

For **labour** and cement in bedding, add from 1/6 to 2/6 each step according to length. *See* award, Tilers'

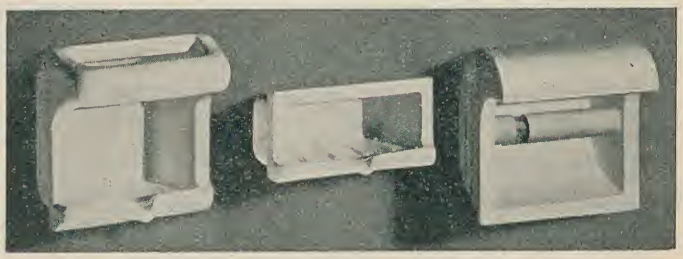
Terazzo Draining Boards, for sinks, 18in. x 12in., size 4ft., x 1ft. 6in., each 25/– (stock size). Special sizes, up to 6ft., 4/– sq. ft. 6ft. to 8ft., 5/– sq. ft.

Terrazzo slabs for walls, facings and floors, laid on site, 25/– Syd.

Ceramic Mosaic Tiling is composed of small circular, square, and octagon vitrified porcelain tiles about $\frac{3}{4}$in. x $\frac{1}{4}$in. thick, formed into numerous designs and mounted upside down on paper similar to other mosaics. They are laid on the prepared cement bed with the paper surface upwards. The paper being removed after the mosaic is in position.

Ceramic Mosaic Tiles, per sq. yd.

Material only, 22/– upwards.



5151 5175 5160

FOWLER'S EARTHENWARE BATHROOM FITTINGS.

No. 5151.	Recess Soap Holder with Grip and Lip, 6 x 6 ...	8/3 ea.
5175.	,, ,, ,, with Lip, 6 x 3	5/– ,,
5160.	Toilet Paper Holder with Hood, 6 x 6 ...	8/9 ,,
5149.	Tile Air Vent, 8 x 4	4/4 ,,
5150.	,, ,, ,, 9 x 3	2/8 ,,
5155.	Recess Soap Holder with Lip, 6 x 6	7/– ,,
5166.	Shower Rose 7″ dia. with Brass Nipple ...	7/6 ,,
5191.	Tumbler, T/brush and Paste Holder	13/9 ,,
5192.	Tile Gargoyle 4 x 4—Projection 3″	7/– ,,
5240.	Bevelled Recess Soap with Lip, 4 x 4	4/2 ,,
5241.	,, ,, ,, ,, ,, 8 x 4	8/– ,,
5242.	,, ,, ,, Grip and Lip, 8 x 4 ...	9/– ,,
5243.	,, .. Paper Holder with Roller 8 x 4	9/4 ,,
5244.	,, Robe Hook to build into wall, 4 x 4	4/– ,,
5245.	,, Strop Hook to build into wall, 4 x 4 ...	4/2 ,,
5246.	,, 6 Brush and Tumbler Holder, 4 x 4 ...	6/– ,,
5248.	,, Shelf Brackets	12/6 pr.
5249.	,, Square Towel Rail Ends	8/4 ,,
5250.	,, ,, ,, Centre	4/8 ea.
5251.	,, 24″ Duco Covered wooden Towel Rail with ends to build into wall ...	12/6 ea.
5252.	,, 30″ do. do.	13/10 ,,

Further particulars and Prices on application. *See Makers Advt., p.* 17.

TILING TERMS.

Plain tile is a tile 10½in. long, and 6½in. wide. Pantile is 13½in. long, and 9½in. wide.

1000 tiles = 1 horse load.

1000 plain tiles weigh 22¼ cwt. 1000 pantiles weigh 47 cwt.

A **plain tile lath** is 1¼in. wide, and ¼in. thick.

MATERIAL ONLY.

4 x 4 Dull Glazed Tile ... ... 25/– s. yd.
4 x 4 Bright Glazed Tile ... ... 23/6 s. yd.
4 x 4 Cream Tiles and Oatmeal ... ... 17/6 s. yd.
6 x 6 do. do. do. ... ... 16/– s. yd.
4 x 4 Ivory Tiles ... ... 16/– s. yd.

A **pantile lath** is 1½in. wide and 1in. thick.

12 **pantile laths** 10ft. long constitute a bundle.

100 plain tile laths measure 5ft. long. 125 4ft. long. 167 3ft. long. 500 feet, any length = 1 bundle.

30 bundles plain tile laths = 1 horse load.

TILES REQUIRED PER SQUARE YARD.

Size Tile.	Number Required	Size Tile.	Number Required	Size Tile	Number Required
15 x 15in.	5¾	6 x 4in.	54	4 x 2in.	162
12 x 12in.	9	6 x 3in.	72	4 x 1½in.	216
10 x 10in.	13	6 x 2in.	108	4 x 1in.	324
9 x 9in.	16	6 x 1½in.	144	3 x 3in.	144
8 x 8in.	20¼	6 x 1in.	216	3 x 1½in.	288
7 x 7in.	26½	4½ x 4½	64	3 x 1in.	432
6 x 6in.	36	4 x 4in.	81	2 x 2in.	324
5 x 5in.	52	4 x 3in.	108		

1¼ paper bag Cement, 125lbs., with 3 bags of sand, will bed 6¼ square yards, ¾in. thick. (*See* Plasterers).

Special **Granite Tiles,** Cream, brown, leather. Sizes 4in. x 4in., 6in. x 6in., 9in. x 6in., per sq. yd., 30/–. Without inset designs, or lines.

Fowler's Flooring Tiles—Tesselated, granite, 2 x 1 and 3 x 1½, Moravian in wide range of patterns and spaces made up to measurements supplied, 12/6 to 24/– sq. yd.

Fowler's Glazed Wall Tiles, White, Black, coloured, oatmeal, mottled, vellum with fittings, 16/6 to 35/– sq. yd.

(*Refer Advt. page* 17).

Fancy Majolica Tiles, Hearth, 15/– to 21/–.
6in. Skirting, in special colours, 18/– per doz.
Glazed Terra Cotta tiles, 8 x 8, 10/–; 6 x 6, 12/6 per yard.

DELFT (Dutch) WALL TILES.

Dados, including capping and round edge, tiles, with introductions, from 42/6 per yd.

Ditto, including art glazure, metal lustre and accidental effect tiles, from 50/– to 60/–.

Ditto, with gold and silver, to £8 per yd.

Ditto, composed of 6½in. x 9¾in. White tiles, 27/6 per yd.

Ditto, composed of 6½in. x 9¾in., Granite or in plain enamel majolica glazures, 35/– per yd.

Strips, 6in. x 1in., from 1/– to 1/6 per ft.

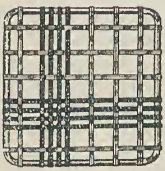
Memorandum. It is by no means surprising that **Wall Tiling** should be so much in favour in the modern homes and buildings of to-day.

Being thoroughly clean and hygienic, and attractive in appearance, glazed tiles need no more than the occasional application of a damp cloth or sponge to maintain indefinitely their original freshness. When to these qualities we add the charm of colour, to a surface texture of wonderful delicacy, especially in the better vellum glazes, it is not remarkable that the demand for tiles grows greater as time goes on. To cope with the increasing demand leading supply houses have created special tile fixing departments and offer technical advice and estimates for carrying out the work free of obligation.

The modern method of **Tile Flooring** provides more scope to express individuality than other methods, and for verandahs, garden paths, bath rooms and kitchen floors there is nothing to equal their lasting beauty and cleanliness. The colours being permanent no amount of wear and exposure will affect their delightful tones, and the smooth level surface and symmetrical manufacture ensure them fitting without any unseemly joints to spoil the appearance of the finished floor.

WIRE WORKER

Woven sheets less than 4ft. super. are charged by the piece, widths of less than 1ft. are charged as 1ft.

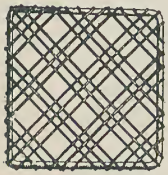


List prices are reckoned at the present price of wire; but for general use as a guide, the quotations are as under.

Fixing to be added.

WOVEN METAL PANELS.

13 gauge Straight Laced Lattice, Crimped Diamond Pattern.



Gauge	16	14	12	10	per
½in. mesh ...	1/1	1/2	1/6	2/6	sq. ft.
¾in. ...	–/11	–/8	1/3	2/–	,,
1in. ...	–/7	–/7½	–/9	1/–	,,
1¼in. ...	–/6½	–/8	–/9½	1/3	,,
1½in. ...	–/6	–/7	–/8½	1/1	,,

Brass wire, reckon four times the above prices.

RIBBON WORK.

Mesh. Strand.	s.	d.
1in. x $\frac{3}{16}$in. double strand, per sq. ft. ...	1	9
1¼in. x ¼in. ,, ,, ,, ,, ...	1	6
1in. x ⅛in., single strand, per sq. ft. ...	1	6
1in. x ¼in. ,, ,, ,, ,, ...	1	9
1¼in. x ¼in. ,, ,, ,, ,, ...	1	3

CHAIN WIRE.

Price per square foot.

	16G.	14G.	13G.	12G.	10G.
½″ Mesh	9d.	10d.	—	—	—
¾″ ,, ...	8¼d.	9d.	10d.	—	—
1″ ,, ...	—	5d.	5½d.	5¾d.	—
1½″ ,, ...	—	3d.	3¼d.	3½d.	5d.
2″ ,, ...	—	2½d.	2¾d.	2⅝d.	3½d.
3″ ,, ...	—	—	—	2½d.	3¼d.

For extras—*see* next page.

Chain Wire Framed with Border Wire.
On panels 10 sq. ft. and over, 2d. sq. ft. extra.
On panels under 10ft., 4d. sq. ft. extra.
Widths less than 12 inches are charged as **one foot.**
Bevelled pieces are measured on the square.

GALVANISED WIRE NETTING.

Rolls 50 yards each. Prices subject to fluctuations.

Mesh	Gauge	Width 24″	36″	48″	
½″	22	23/5	34/2	45/6	Price per Roll of 50 yards.
¾″	20	17/5	24/8	32/11	
1″	20	12/10	18/3	24/3	
1½″	18	12/–	17/10	23/10	Cut Rolls Extra.
2″	18	10/1	13/8	18/3	
2″	19	8/–	10/9	14/4	

STEEL FENCING WIRE.

Table showing Quantity Required per Mile of Fencing.

LYSAGHTS TABLES.

Gauge	Length per cwt.	Weight required per mile									
		1 Wire		2 Wires		3 Wires		4 Wires		5 Wires	
	Yds.	c.	q. lbs.	c.	q. lbs.	c.	q. lbs.	c.	q. lbs.	c.	q. lbs.
4	269	6	2 4	13	0 8	19	2 12	26	0 16	32	2 20
6	393	4	1 26	8	3 24	13	1 22	17	3 20	22	1 18
8	566	3	0 12	6	0 24	9	1 8	12	1 20	15	2 4
10	882	1	3 27	3	3 26	5	3 25	7	3 24	9	3 23
12	1333	1	1 8	2	2 16	3	3 24	5	1 4	6	2 12

Gal. Fencing Wire,	No. 8	... 17/– per cwt.	...	556 yds.
	No. 10	... 17/6 per cwt.	...	882 yds.
	No. 12	... 22/– per cwt.	...	1333 yds.
Gal. barbed Wire	No. 12	... 24/– per cwt.	...	450 yds.
	No. 14	... 26/– per cwt.	...	700 yds.

GAL. FENCING WIRE (PLAIN AND BARBED). SPACING TABLE.

Distance apart	NUMBER OF POSTS PER MILE.										
	9ft.	10ft.	12ft.	14ft.	16ft.	18ft.	20ft.	22ft.	27ft.	36ft.	45ft.
Posts	587	528	440	378	330	293	264	240	196	147	118

Example of how to estimate Cost of Fencing.

Approximate costs per mile of girder steel fencing, consisting of five plain wires and one barb, with standards 21ft. apart, and two droppers between each standard. Height of fence, 3ft. 9in.

Approx. Weight cwt.	qrs.	lbs.		F.O.R. Sydney £	s.	d.
15	0	0	250 Steel Fencing Posts 6ft. long @ 1/– ea. ...	12	10	0
3	0	0	10 Steel Straining Posts with sole pieces 9/– ea.	4	10	0
	2	0	4 Steel Straining Stays with Ground Plates 8/– ea.	1	12	0
6	2	0	480 Steel Fencing Droppers, 40/– per 100	9	12	0
16	0	0	16 cwt. Galvd. Fencing Wire No. 8, 17/– cwt.	13	12	0
4	0	0	4 cwt. Galvd. Barbed Wire No. 12, 24/– cwt.	4	16	0
45	0	0		46	12	0
			Labour, erecting 2/– chain	8	0	0
				£54	12	0

For wooden or other posts, if used, leave out the first three items, and add cost.

WIRE NETTING AND FENCES.

When erecting a new wire fence arrange for one of the wires to be 36in. from the ground, and bore the holes for wire 1in. from the side of the posts, thus prepare for 42in. netting, as it will stretch easily and neatly along the fence without bulging round each post.

To prevent netting from corroding dip the roll 6in. or 7in. in 2 parts of coal tar and 1 part kerosene, heated nearly to boiling point, and let dry before using. Block and tackle very handy.

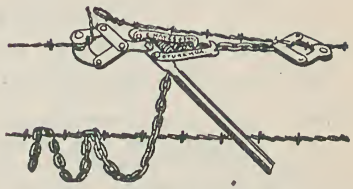
BUZACOTT'S ORNAMENTAL FABRIC FENCES.

Height.	24″	30″	36″	42″	48″	54″	
Style A. Mesh 1¾″	1/–	1/–	1/0½	1/1½	1/2½	1/3½	per running foot
,, 2½″	–/9½	–/9½	–/10	–/11	1/–	1/1	
,, 3″	–/8½	–/8½	–/9	–/10	–/10½	–/11½	,,
Style C.	—	—	1/1	1/2	1/3	1/4	,,
Style F.	—	–/11½	1/–	1/1	1/2	1/3	,,

DONALD'S WIRE STRAINERS.
Each, complete, £1/2/6;
Segments, each 1/6.

POST LIFTING JACKS.

No. 1 (10 ton)	...	£6	15	0
No. 2 (6 ton)	...	5	0	0
No. 3 (1½ ton)	...	1	0	0



Donald's Wire Strainer.

CYCLONE RINGLOCK FENCING.

No. of Lines	Catalogue No.	Height	Price per Chain	Price per Mile
			s. d.	£ s. d.
5	5HT	26″	4 9	17 5 0
5	5H	26″	6 9	25 5 0
6	6HA	28″	8 0	29 15 0
6	6H	36″	8 6	31 0 0
8	8L	42″	9 6	34 15 0

Note.—Orders for less than ½ mile are charged at Chain Rate.
For orders of less than 5 chains 20% extra is charged for cutting.

BARBED WIRE.

In 1 cwt. reels—Barbs 3″ apart.

12G "Iowa" Pattern	£23	16	8	ton	Approx. 460	yds. to cwt.
14G „ „	£25	9	2	„	„ 670	„ „
12½G Special	£24	18	4	„	„ 620	„ „
14G „	£26	10	0	„	„ 860	„ „

BUZACOTT'S DOUBLE ORNAMENTAL GATES. Fig. 170.

Height 4ft.

Width	8ft.	10ft.	12ft.
Each	179/–	214/–	248/–

Scrolls 7/6 each extra.

Fig. 170. SINGLE GATES.

Height 4ft.

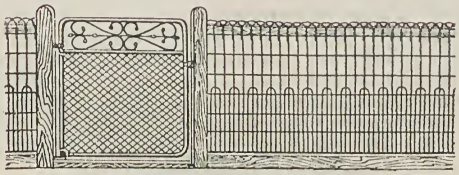
To fit openings	3ft.	3½ft.	4ft.
Each	64/6	73/–	81/–

Scrolls, 2/6 extra.

CYCLONE HAND GATES.

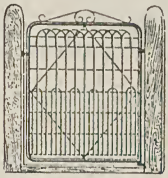
Height 3ft. 10in.

To fit openings	...	...	...	3ft.	3½ft.	4ft.
No. 193 Each	...	...	...	22/6	23/6	25/6
No. 268 „	...	...	...	59/–	64/–	69/–



"Cyclone" F fabric fence with Handgate No. 228

Handgate No. 268



Handgate No. 199

BUZACOTT'S GALVANIZED CRIMPED DROPPERS AND LOOPS.

Per 100.

Length	6G.	4G.	Length	6G.	4G.
30in.	10/6	14/–	40in.	14/–	18/9
32in.	11/3	15/–	42in.	14/6	19/3
34in.	12/–	16/–	44in.	15/–	20/–
36in.	13/–	17/3	46in.	15/9	21/–
38in.	13/6	17/9	48in.	16/3	21/6

Galvd. Loops for Crimped Droppers 200 loops = 1 lb., 6d. lb.

KINGLOC DROPPERS.

Length	Approx. Weight per 100.	Price per 100
18in.	68lbs.	26/6
21in.	80lbs.	29/6
24in.	91lbs.	33/6
27in.	103lbs.	36/–
30in.	114lbs.	39/6
33in.	125lbs.	42/6
36in.	136lbs.	45/6

CYCLONE STEEL FENCE POSTS.

6ft., 11d., each, 6½ft., 1/4 each, 7ft., 1/6 each. Driving Caps, 2/– each.

PLANT AND TOOLS

MACHINERY AND APPLIANCES.

Present list of prices referred to herein for portion of Contractor's Plant and Tools, not previously mentioned throughout this work. **This information is merely for the convenience of contractors and not for the purpose of advertising firms.**

(Prices are subject to market fluctuations).

Adzes.—Fencers, 7/6 each. Railroad 6in., 11/6 each.

Augers.—Post Hole Digger 6in., 16/6, 9in., 21/3 each.

Axes.—Squaring, 12in. blade, 25/– each. Kellys 5 Pound Tasmanian-Handled, 10/– each. Mortice Axes, Double Ended, 1/3 Pound.

Hatchets.—Lath and Shingling, 5/– each. Claw, 4/9. Carpenter's Bench, 4in., 6/–, 5in., 7/9 each.

Barrows.—Navvy, wood with wrought iron wheels, 35/– to 45/– each.

Concrete Barrows.—3C/F, 42/6. 4C/F, 60/–. 6C/F, 85/– each.

Bricks Carts.—£30/–/– to £35/–/– each. Cart Harness, £6/10/–.

Buckets.—Galvanised 13in., 3/9 each. 14in. Strapped extra strong, 5/– each.

Breast Drills.—3 jaw chuck to take Rd. Shank Drills to ½in., geared fast and slow, 27/6 each.

Chain Drills.—Automatic Self Regulating Speed, four feet of stout chain for drills to ½in., 21/– each.

Wall or Post Drills.—Various types from 40/– to 85/– each.

BLACKSMITH'S PLANT.

Anvils.—28lbs., 48/6 each. 56 to 84 lbs., 100/– per cwt.

Forge Tools.—2/3 to 2/6 lb.

Blacksmith's Bellows.—18in., 50/–, 24in., 80/–, 30in., 125/–, 36in., £10/–/–, 42in., £17/10/– each.

Water Tue Irons.—12in. to 18in, 37/6 each to 52/6 each.

Hand-Crank Forges and Blowers.—

"Rapblo," 18in., £5/5/–. 22in., £5/15/–.

No. 1 "Rapid," 18in., £8/5/–. 22in., £8/12/6. 24in., £9/–/–.

No. 2 „ Oblong 20 x 22, £9/12/6.

Leg Vyces.—

4″	4½″	5″	6″ Jaw.
65/–	75/–	92/6	£5/15/– Each.

Swage Blocks.—14 x 4½, 65/– each. 18 x 5, 95/– each.

Blacksmith's Tongs.—16in., 5/9. 18in., 6/3 each.

CRAB WINCHES.

	Cast Iron Side Frames £ s. d.	Mild Steel Plate Frames £ s. d.
5 cwt. Single Purchase	4 10 0	5 15 0
8 „ „ „	9 0 0	10 0 0
12 „ „ „	9 12 6	10 12 6
20/25 Double Purchase	14 17 6	16 0 0
30/35 „ „	18 0 0	20 0 0
40/50 „ „	20 10 0	23 10 0

Hammers.—Carpenter's No. 7, 6/9, No. 5, 7/3 each. Slaters', 5/6. Bricklayers', 3/9 each. Sledge, 7lbs. and up, 8d. per lb. Drill, 3lbs., 36/– doz., 4lbs., 39/–, 5lbs., 45/– doz. Quarry Mauls, 1/1 per lb. Napping 1¼lb., 1/8 each, 1½lb., 1/9 each, 2lbs. 2/– each Engineers' Ball Pein, 1lb., 1/3 each.

Hand Saws.—Disstons 28 x 26″, 16/– each. 28″ Rip, 17/6.

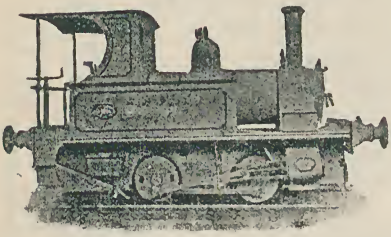
Planes.—Stanley or Maples all iron. Smooth, 16/6 to 22/6. Jack, 22/6 to 25/–. Fore, 29/– to 36/–.

Floor Clamps.—Little Booster Improved, 32/6 each. Speed Screw, 43/6 each.

Sash Clamps.—Heavy T. Bar, 42in., 26/6, 48in., 27/6. Light T. Bar, 36in., 17/6, 42in. 18/9. Cramp Heads (Crampton), 7/6 set.

STEAM LOCOMOTIVES.

(Approx. Prices.)



£140 per ton of total weight. viz., 10 ton Locomotive, £1,400.

Main Line Locomotive, £160 per ton weight.

Side Tip Trucks.

one cub. yd., 2ft. gauge ... £16 0 0
¾ cub. yd., 2ft. gauge ... £15 15 0
½ cub. yd., 2ft. gauge ... £15 10 0

Light Steel Rails, 14 to 30lbs. per yd., with fish plates, bolts and nuts, rail or bridge, £16 per ton.

	£	s.	d.
Hydraulic Jack, Tangyes' (ship pattern), 50 tons each	37	10	0
Trewhella 4 tons double purchase,	6	0	0
Monkey Jack, with Guide and two Spears, to lift 10 tons	10	15	0

Wallaby Lifting Jack.

For Prices, *see* page 384.

211E145—" Wallaby " Double-purchase Jack. Lift 4 tons.
Weight, 56lb. 5 15 0

" Wallaby " Double-Purchase Special Jack. Painted brown, lift 6 tons. Weight, 70lb. 6 10 0
For stump-grubbing, log-rolling and general lifting purposes. Quick, powerful, simple, durable.

Trewhella Hand Monkey Winch Grabber, or Forest Devil, for pulling down trees with wire ropes.
Power—12 tons direct from drum, and 24 tons with snatch block.
Weight of plant, 500lbs., price, equipment complete ... £37 10 0
Ditto, with horse grubber and full equipment ... £67 10 0

LADDERS.

Painters' and Builders' Ordinary Ladders.
10in. centres, 2/3 per ft. Over 25ft., 2/6 per ft.

Bricklayers' Ladders.
8½in. centres, 2/6 per ft. Over 25ft., 2/9 per ft.

Extension Step Ladders.
5ft. Extends 8ft. 6in., 18/6 each.
10ft. ,, 18ft. 0in., 37/6 each.

Extension Ladders.
7ft. Closed—Extends to 12ft., 36/– each.
12ft. ,, ,, ,, 22ft., 62/6 ,,

Painters' Trestles.—5/– per ft.

Painters' and Builders' Steps.—3/– per ft.

SCREENS—CONTRACTORS' AND BUILDERS'.

In Wood Frame, very strong. Any size made to order.

Mesh, inches	¼	⅜	½	1
Each	37/6	36/–	34/–	30/–

Shovels, Navvy, D.H.S.M., 5/6 to 8/–.
Shovels, post hole, 5/6. Spades, 8/3. Picks Road D.E 4/6 to 5/6.

STEEL.

BALLAST OR GARDEN ROLLERS.

No. 1 Pattern Double Cylinder

Width	Diameter	Weight cwts. qrs. lbs.	Price Each £ s. d.
20″	20	3 0 12	9 10 0
20″	22	3 2 12	10 17 6
22″	22	3 1 12	11 0 0
24″	22	3 2 3	11 5 0
24″	24	3 3 24	11 10 0
26″	24	4 1 6	11 15 0

No. 2 Water Ballast Pattern

21″ wide, 20″ diameter.
When empty 3 0 26. When full 4 1 23, £14/5/0.
25″ wide, 24″ diameter.
When empty, 4 1 0. When full, 6 3 0, £17/15/–.

TOOLS—MISCELLANEOUS.

For Various Trades.

Spud or Jumper Bars—Octagon Steel
$\frac{7}{8}$″ x 5′, 10/–. 5½′, 10/3. 6′, 10/9. 6½′, 11/– each.
1″ x 5′, 12/6. 5½′, 13/3. 6′, 13/9. 6½′, 15/3 „
1⅛″ x 5½′, 15/9. 6′, 17/–. 6½′, 18/6 each.

Crow or Pinch Bars—Octagon Steel
$\frac{7}{8}$″ x 5′, 9/–. 5½′, 9/3. 6′, 10/–. 6½′, 10/3 each.
1″ x 5′, 11/–. 5½′, 12/6. 6′, 13/–. 6½′, 14/6 „
1⅛″ x 5½′, 15/3. 6′, 16/6. 6½′, 18/– each.

Wrecking Bars
¾″ x 18″, 4/3. 24″, 4/6. 30″, 4/9. 36″, 5/– each.

Brick Bolsters, 4″ light, 2/9 each. 4½″ heavy, 3/9 each.

Bricklayers' Trowels, Brades 12½″, 10/–. 13″, 10/6 each.

Plasterers Trowels, Tyzacks, 11/6 to 15/6 each.

Masons or Blacksmiths' Squares, 24″ x 12″, 5/6 each.

Stillson Wrenches, Genuine, 14″, 8/–. 18″, 11/6 each.

Footprint Wrenches, Ellins, 9″, 3/9. 12″, 5/9. 14″, 7/– each.

Plumbs and Levels, Rabones—
Aluminium 24″, 17/6. 30″, 22/6 each.
Wood, 24″, 13/6. 30″, 14/6 each.

Blow or Burning Off Lamps, 1 pint capacity, 19/– each.

Brazing Lamps, 2 pint, 36/6 each.

Benzine Soldering Irons, 36/– each.

Reeds Pipe Cutters, No. 1, 17/6. No. 2, 22/6 each.

Measuring Tapes, Rabones Steel, 33ft., 22/6. 66ft., 37/6 each.

Tinsmiths Snips, Mathiesons—
Straight 12″, 16/– each.
Bent, 12″, 16/6 each.

Tube or Pipe Vices, F/Print to 1½″, 14/– each. To 2″, 18/– each.

LIGHTING, HEATING, FIRE RESISTING, REFRIGERATING

LIGHTING.

For Country Residences.

Moffat Virtue Ltd. 11 *Palmer St.* Diesel Engine. Lighting —Plant. Battery Equipment, 16 cells for 1½ KW, 32-45 Volts for 30 lights. Refrigerator and household conveniences.

4 Glass or Ebonite cells, 200 amp. hour, (7½ cubice feet), capacity. 3 H.P. Diesel Engine. 1½ KW, 35 lights. 110-165 Volts.

6 H.P. Diesel Engine, 45 lights, refrigerator and 200 amp. hour 11.6 cubic feet capacity, 2 KW.

6 H.P. ditto, 60 lights, refrigerator and 200 amp. hour. 19.4 cubic feet capacity, 3 KW.

Hastings Deering Lighting Plants are available in either petrol or Diesel types ; all are equipped with famous Exide batteries ; are simple to operate for electric power in treating stores and refrigerator &c., 4d. to 11d. per unit.

Iron Horse Generator will light **twelve** 25 Watt lamps, equal to 300 Watts. Air cooled, 4 cycle machine. Weight, 75lbs. Small sized domestic, with 12 Volt Battery, £37. Small for light, power and radios, 300 Watts, 12 Volts.

LIGHTING.

From Kerosene only, the **Aladdin Safety Lantern** produces 200 candle power of white light. Acting on the **improved Primus Principle** of gas-generating, the gas is conveyed through a silk woven mantle made in two sizes, small 6½d. each, large, 8½d. each. The safety margin of 32lbs. per square inch as a storm lantern.

Boudoir, 27/9.

Aladdin Electric Better Sight Lamp.

Lantern price complete, with tools and mantle, 75/– each, with reflector, 12/6 extra. As a bright white table light, or standard. Prices 90/– and 135/– respectively. Chromium finish with 16in. Empire shade for general use, 88/–. The tall Standard chromium finish, 140/– to 150/–, fluted.

For further information, see advt., pp. 13, 18.

Aladdin Electric Better Sight Lamp, £4/7/9 to £6/15/–.

The **Aladdin** improved Primus stove, with single burner, **39/6**; with 2 burners, **£3/15/–**.

Aladdin Cooker Improved **Burner,** adjustable to any Primus, 7/6, equipped with automatic cleaner. No pumping, the **screw handle turns off and on** the kerosene. No pricking needles required), but the pressure remains in the tank until the cooker is used again. Costs ¾d. per hour to run per burner.

Aladdin Double Cooker

Aladdin Kerosene Table Lamp.

Efficient **ovens, single stove, 29/6, double stove, 39/6**; Kerosene **laundry iron,** with hot point, **59/6**. Safety margin, 32lbs. per square inch.

As a Radiator with **heat cone and reflector,** which can be changed in a minute to cooking ring, by lifting out of their sockets fittings and put on the cooking units, complete, £3/15/–. Boils 2 pints water in 3 minutes.

Aladdin Kerosene Heater-Cooker.

For further information, *see Advt. p.* 13 and 18.

HECLA-ELECTRIC-COMPLETE DESIGN HOT WATER SYSTEM.

The " complete " design system—Capacities from 35 to 85 galls. is provided with copper feeder cistern of suitable capacity, fitted with ball valve, drip trays etc.

The storage tank is fitted with " off peak " or " continuous " rating elements. Thermostat, Sludge Cock, and provision is made for Booster Element.

For Prices etc.—*see* page 388.

HECLA-ELECTRIC COMPLETE DESIGN HOT WATER SYSTEM.

			£	s.	d.
Capacity 35 galls. (daily yield)	30/35 galls.	160° Price	22	10	0
„ 45 „ „	40/45 „	„ „	24	2	6
„ 60 „ „	55/60 „	„ „	30	8	0
„ 70 „ „	65/70 „	„ „	35	9	6
„ 85 „ „	80/85 „	„ „	39	10	6

The cost of installing a Hecla Hot Water System varies from £35 upwards according to the number of outlet points required and the position thereof.

METTERS " MULTI-POINT " AUTOMATIC SERVICE HEATERS.

		£	s.	d.
No. 0.	2 galls. per minute. Chrome Plated	13	5	0
No. 1.	2½ „ „ „	15	0	0
No. 2.	3 „ „ „	21	15	0

Brackets and Fixing extra.

New **Model K** of Williams Hushed Heat.

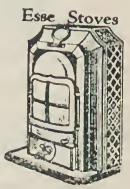
Oil-O-Matic or ignition of flame is by positive high tension electric current, can be installed in basement, for **Heating and Ventilation** of buildings.

Prices for installing &c., Sainsbury & Co., Grose St., Camperdown.

The Sydney County Council supply **Electric stoves** at £21 with 2 hot plates and 4 hot plates, large ovens to £30 and £55/15/– by instalment varying from 8/8, 12/8, 15/– to 22/8 per month.

NOTE—*See Electrical Section.*

" **Esse** " **Coke** Slow Combustion Heating Stoves, Majolica enamelled, in colours, from £13/2/6 to £25/–/–.



In this patent heating stove the flues encircle the stove, and the full benefit of the heat is obtained and regulated by a patent regulator on the ashpan front, which controls the supply of air to the fire. Being of slow combustion, the refilling of fuel is necessary every 12 to 36 hours, according to size. The fire is raked by moving a bottom grate worked by a handle from the outside. The front of stove is closed entirely a mica panelled fire door showing the glow of the fire. Where no recessed fireplace exists, it can be fixed flat against the wall with the flue pipe leading through only. *See advt., pp.* 2, 36.

The " Kosi."—Continuous burning heating stove entirely manufactured in Australia is made in two sizes—Black Lead finish and Mottled Enamel in several colours. The No. 2 has an average heating capacity of 4,000 cubic feet and No. 3, 8,000 cubic feet. Burns ordinary small coke and is economical to run—approx. 12 pounds of fuel being sufficient for 12 hours burning. Prices range from £7/10/– to £10/–/–.

ARMOURED SLIDING FIRE DOORS.

With Patent Self-Closing Apparatus.

These are made of three or four thicknesses of timber (according to size of opening), and are completely covered with Tinned Steel Sheets, put on firmly with shingle joint, lapped free to expand. Automatic release. temperature clip.

By excluding the atmosphere from the wood, combustion is prevented. An exposure of several hours to the flames only resulting in the timber becoming carbonised to the depth of a fraction of an inch.

Price according to area. Further details, *see Advt. p.* 21.

Mica.—A marvellous mineral is Mica. It can be parted to the one-thousandth part of an inch, and it is stated by electricians that these films can withstand a voltage of 20,000. The value of Mica is largely dependent on its transparency, capacity of splitting, and non-conducting of electricity and heat.

According to Dr. H. T. Jenson, Director of Mines, Queensland, bulk Mica brought from Alice Springs, Macdonald Ranges, brought 32/6 per lb. in New York. The present prices of cut clear Mica in sheets 2 to 3 inches thick, and 14 x 10 inches is approx. 30/– per lb.

CHEMICAL FIRE EXTINGUISHERS.

"**Simplex**" Reversible type, for offices, warehouses, factories, theatres, hotels, etc., £4/5/–.

Also larger type on wheels, soda acid, or pyrofoam.

Grinnel Sprinklers fitted throughout ceilings with pipes. Further details and prices on application—Wormald Bros.

INCINERATORS.

Incineration of waste refuse and garbage is to-day past the experimental stage.

"Goodrid" as designed have many exclusive features, every one of which contributes towards its success and popularity.

Easily installed by the Builder at low cost.

See Advt. p. 22.

	Size of Cabinet.	Price Refrigerator	Extra cost Maple Chest.	Cost Power
		£	£	d.
No. 510	49 x 37 x 22	120	40	2
No. 1015	63 x 40 x 22	140	58/10/-	3
No. 1520	65 x 52 x 23	160	69	4
No. 2028	73 x 51 x 23	180	84	5
No. 3645	81 x 69 x 25	195	92	5½

KELVINATOR FREEZER.

Kelvinator is an automatic electrical Refrigerator Machine for country homes, and consists of a reciprocating compressor driven by an electric motor with air cooled condensing coils mounted around the compressor and motor. This part of the plant is connected to the refrigerator cabinet by two copper tubes and the wires for the motor from local electric station. A thermostat control, placed inside the cabinet regulates the variation in temperature there and starts and stops the motor as required, maintaining an even temperature—from 40 degrees to 45 degrees Fahrenheit—inside the refrigerator. The only attention needed by whole plant is an occasional oiling.

The "Lister Lite" and **"Tudor"** is a self-contained electric generator for lighting, etc., with 2 to 3½ h.p. engine for 32 to 110 volts according to the cells. For 16 to 30 lights capacity.

ICE CHESTS.

	Height	Width	Depth			
No. 1	... 38	21	14½ inches 2 Shelves	£9	12	6
No. 2	... 41½	23½	17 inches 2 Shelves	£10	17	6
No. 3	... 45	26	20 inches 2 Shelves	£13	5	0
No. 4	... 31	33	20 inches 2 Shelves	£19	0	0
No. 5	... 49	36	18½ inches 3 Shelves	£27	10	0
No. 6	... 62½	63½	24 inches 8 Shelves	£50	0	0

TO CLEAN WATER PIPES WITH POTASH.

Water pipes that are partly clogged may be cleaned by flushing them with a strong solution of water and potash. To introduce this solution, shut all faucets on the same branch, turn the water off at the cut-off, put the vessel containing the solution under the faucet spout, and open the faucet. The spout touching the liquid. Water draining from the branch through the drain plug causes a vaccum in the branch, which will draw the potash solution from the vessel into the pipes. The faucet spout must be kept under the surface of the solution until the latter is all drawn in or until the suction ceases.

DICK'S GENUINE " DIXIT " BELTING.

Price per foot.

Width	1″	1½″	2″	2½″	3″	3½″	4″	4½″	5″	5½″	6″	7″	8″
3 Ply	8½	1/1	1/5	1/9	2/1	2/5	2/10	3/4	3/8	4/2	4/5		
4 ,,		1/5	1/10	2/4	2/10	3/3	3/9½	4/4	4/9½	5/5	5/11	6/11	8/6
5 ,,				2/11	3/6	4/1	4/8	5/3	6/–	6/8	7/5½	9/–	10/6½
6 ,,										8/–	8/9	10/9	13/4
8 ,,													17/–

(Other widths also available up to 18″).

Agents : Smith & Gluyas Pty Ltd., can quote on indent for any Ply up to 72″ wide.

PRACTICAL METHODS OF WORKING " DIXIT " DRIVING BELTS.

Tension. In putting the Belts to work in the first instance, take out ¾ of an inch for every 10 feet from the dead length measurement over both pulleys. Take out one inch per 10 feet if the drive is slow and hard. These remarks do not apply to belts for use on high-speed wood-working machines. Such belts should be fitted to the exact dead length measurement. If the belt slips, take it up a little. Half a dozen drops of " BET-A-GRYP " Belt Dressing or Castor Oil on one of the Pulleys will help it to grip very materially.

Dick's " Dixit " Belting being more flexible than other belts, may be adopted to very small pulleys, as shown by the following table : 3 Ply Belts are suitable for 3″ diameter pulleys and upwards.

4 ,, ,, ,, ,, ,, 5″ ,, ,, ,, ,,
5 ,, ,, ,, ,, ,, 8″ ,, ,, ,, ,,
6 ,, ,, ,, ,, ,, 12″ ,, ,, ,, ,,
8 ,, ,, ,, ,, ,, 18″ ,, ,, ,, ,,

The ratio of pulley diameters should not exceed 6 to 1.

Table showing the Horse-Power which Each Inch of Width of Belting, from 3-ply to 10-ply, will transmit at the speeds given.

Speed of Belt per minute.	3 Ply.	4 Ply.	5 Ply.	6 Ply.	7 Ply.	8 Ply.	9 Ply.	10 Ply.
Feet	h.p.	h.p.	h.p.	h.p.	h.p.	h.p.	h.p.	h.p.
500	0.60	0.90	1.21	1.51	1.81	2.12	2.42	2.71
750	0.90	1.36	1.81	2.27	2.72	3.18	3.63	4.08
1000	1.21	1.81	2.42	3.03	3.63	4.24	4.84	5.44
1250	1.51	2.27	3.03	3.79	4.55	5.30	6.06	6.82
1500	1.81	2.72	3.63	4.55	5.45	6.36	7.27	8.17
1750	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54
2000	2.42	3.63	4.85	6.06	7.27	8.48	9.70	10.90
2250	2.72	4.09	5.45	6.82	8.18	9.54	10.90	12.27
2500	3.03	4.54	6.06	7.58	9.10	10.60	12.12	13.64
2750	3.33	4.99	6.66	8.34	10.00	11.66	13.32	14.99
3000	3.63	5.44	7.26	9.10	10.90	12.72	14.52	16.34
3250	3.93	5.90	7.87	9.85	11.81	13.78	15.74	17.71
3500	4.24	6.36	8.48	10.60	12.72	14.84	17.96	19.08
3750	4.54	6.81	9.09	11.36	13.63	15.90	18.18	20.44
4000	4.84	7.27	9.79	12.12	14.54	16.96	19.40	21.81
4250	5.15	7.72	10.30	12.88	15.45	18.02	20.60	23.17
4500	5.45	8.18	10.90	13.64	16.36	19.08	21.80	24.54
4750	5.75	8.63	11.51	14.40	17.28	20.14	23.02	25.91
5000	6.06	9.08	12.12	15.16	18.20	21.20	24.24	27.28

Note.—These calculations are given for ordinary loads over Pulleys of proper diameters. Anything abnormal should be taken into consideration in specifying the Belt required based on 180° arc of contact.

Further information and technical advice on application, see Agent's Advt., p. 32.

PUMPS AND HYDRAULICS

MEMORANDA.

To convert head in feet into pounds pressure per sq. inch, multiply by .434.

To convert pressure per sq. inch into head in feet, multiply by 2.31.

To find the horse-power in water, multiply the quantity in cub. feet per minute by the head of water in feet, and the result by .0016098. Result is based on an efficiency of 85 per cent. in the water wheel.

Doubling the diameter of a pipe increases its capacity four times.

Theoretically, water can be raised by suction 33ft., but practically only 26ft. to 29ft.

Height of tank being known, to find diameter of tank needed for any capacity: Divide quantity desired by .0034, divide remainder by height in inches, and obtain sq. root. The value thus obtained is the diameter in inches, divide by 12 to obtain diameter in feet.

To find capacity of tank in gallons: Squre diameter in inches, multiply by height in inches, multiply by .0034, the product is the capacity in gallons.

ESTIMATING THE H.P. OF STREAMS.

Ernest Muller, A.M.I.M.E., consulting engineer, London, S.W., writes:—

"When calculating a number of horse-power of a stream, estimate the number of cub. ft. flowing in a stream per minute, multiply it by the distance the water has to fall, and then multiply this by 0.0014, and you will get the actual number of horse-power obtained by a plant with 75 per cent. efficiency.

The figure 0.0014 is obtained as follows:—The weight of a cub. ft. of water (62.321), multiplied by efficiency (0.75), the total divided by 33.00 = 0.0014175."

1 cubic foot per second equals 374 Imp. gallons per minute.

1 cubic foot of **fresh water** weighs 62.5 lbs., and contains 6.232 gals.

1 cubic foot of **sea water** weighs 64.25lbs.

1 cylindrical foot weighs 49.08lbs., and contains 4.894 gals.

1 gallon weighs about 10lbs. **8 gallons** measure 1 bushel.

SIZES OF PIPES FOR WATER.

Table of approximate suitable diameters of pipes for conveying different quantities of water. For short mains up to 200 yards long, the diameter of pipe is not of much importance, but when they exceed 200 yards in length the diameters given in this table are desirable:—

Gals. per min.	Dia. of pipe.	Weight of 100ft. c. q. lb.	Gals. per min.	Dia. of pipe.
½	½		60	4
¾	¾	0 3 0	100	5
1½	1	1 0 5	160	6
3	1¼	1 1 22	220	7
5	1½	2 1 10	300	8
10	2	2 3 2	450	9
15	2½	4 0 6	500	10
20	3	6 0 8	800	12

WATER WEIGHTS AND MEASURES.

One Imp. gal. = 277.274 c. in.
" " = .16 c. ft.
" " = 10.00 lbs.
" " = 4.537 litres.
One U.S. gal. = 231 c. in.
" " = .133 c. ft.
" " = 8.33 lbs.
" " = .83 Imp. gall.
" " = 3.8 litres.
One cub. in. = .00367 lb.
" " = .003607 Imp. gall.
One cub. ft. = 6.23 Imp. gall.
" " = 28.375 litres.
" " = .0283 cub. metre
" " = 62.35 lbs.
One lb. = 27.72 cub. in.
" = .10 Imp. gall.
" = .4537 kilo.
One cwt. = 11.2 Imp. gall.
" = 1.8 c. ft.

One ton = 35.9 c. ft.
" = 224 Imp. gall.
" = 1000 litres (approx.).
" = 1 c. metre (approx.).
One litre = .22 Imp. gall.
" = 61 c. in.
" = .0353 c. ft.
One cub. metre = 220 Imp. gall.
" " = 1.308 c. yds.
" " = 61028 c. in.
" " = 35.31 c. ft.
" " = 1000 kilos.
" " = 1 ton (approx.).
" " = 1000 litres.
One kilo. of water = 2.204 lbs.
One vedro of water = 2.7 Imp. gall.
One eimer of water = 2.7 Imp. gall.
One pood of water = 3.6 Imp. gall.
One Russian fathom = 7ft.
One atmosphere = 1.045 kilos. per sq. in.

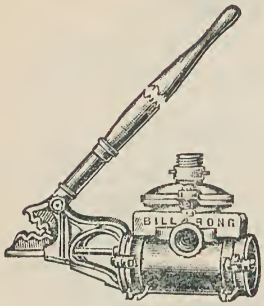
A column of water 1 foot high = .434 lb. pressure per square inch.
A column of water 1 metre high = 1.43 lbs. pressure per square inch.
A pressure of 1lb. per square inch = 2.31 feet of water in height.
One Imperial gallon crude petroleum = 8.2 lbs. (approximately).
One ton petroleum = 275 Imperial gallons (approximately).

THE PRESSURE OF WATER AT DIFFERENT HEADS.

(Per Square Inch.)

Head of water. ft.	Pressure. lbs.	Head of water. ft.	Pressure. lbs.
1 = ...	.433	100 = ...	43.3
2 = ...	.86	110 = ...	47.6
3 = ...	1.3	120 = ...	52.0
4 = ...	1.73	130 = ...	56.3
5 = ...	2.16	140 = ...	60.6
6 = ...	2.6	150 = ...	65.0
7 = ...	3.03	160 = ...	69.3
8 = ...	3.46	170 = ...	73.6
9 = ...	3.9	180 = ...	78.0
10 = ...	4.33	190 = ...	82.3
20 = ...	8.66	200 = ...	86.6
30 = ...	13.00	210 = ...	91.0
40 = ...	17.33	220 = ...	95.3
50 = ...	21.66	230 = ...	99.6
60 = ...	26.00	240 = ...	104.0
70 = ...	30.33	250 = ...	108.3
80 = ...	34.66	260 = ...	112.6
90 = ...	39.00	270 = ...	117.0

"BILLABONG" LOW DOWN DOUBLE-ACTING FORCE PUMPS.



Total vertical lift and force 50 ft. from water to point of discharge. Suction lift must not exceed 25 ft. Ratchet Geared. Easy to operate.

3″ x 4″ Stroke for 1½″ pipe—
Cap. 480 gals. per hour 75/– ea.
5″ x 5″ Stroke for 2″ pipe—
Cap. 1680 gals. per hour 90/– ,,

EDISON'S DIAPHRAGM BILGE PUMPS.

Hand Power Suction Pumps.

Approx. Prices

For Water containing Sand and Mud.

No. 2—2½in.	Suction Pipe,	capacity	1800	gals.	per hour	...	£5 15	0
No. 3—3in.	,,	,,	4000	,,	,,	...	6 15	0
No. 4—4in.	,,	,,	6000	,,	,,	...	10 10	0

SEMI ROTARY PUMPS.

No. 1	2	3	4	5	6	7	
29/–	34/6	42/–	50/–	58/–	68/–	95/–	ea.

"BILLABONG" CENTRIFUGAL PUMPS.

These pumps are made only of the best material and are well mounted on a substantial base. Swivelling discharge on all sizes can be adjusted to almost any angle.

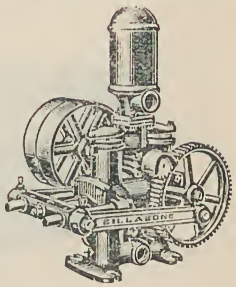
Belt Driven—No Companion Flanges or Foot Valves.

	¾″	1″	1¼″	1½″	2″
Gals per min.	15	20	30	50	80
	70/–	85/–	100/–	£6/10/–	£7/–/–
	2½″	3″	4″	5″	6″
Gals per min.	120	250	360	550	800
	£10/–/–	£12/10/–	£16/–/–	£20/–/–	£28/10/–

For further information, *see Agent's Advt., p.* 36.

BILLABONG DOUBLE ACTING PISTON PUMPS.

With Fast and Loose Pulleys for Petrol Engine or Other Belt Drive. Made for elevations up to 250 ft. head.



Dia. of Barrel	Length of stroke	Gals. per hour not allowing for slippage	Geared	Price
2½″	4″	339	5 to 1	£16/10/–
3″	5″	611	,,	£23/–/–
4″	5″	1086	,,	£27/–/–
5″	5″	1697	,,	£34/–/–

For further information, *see Agent's Advt. page* 36.

THE PULSOMETER STEAM PUMP.

A simple and cheap apparatus for raising water and other liquids by direct power or pressure of steam. A good feature of the Pulsometer is the simplicity with which the few wearing parts can be immediately replaced.

It will work on a constant suction without attendance, or as long as the steam and water are supplied to it. It requires no lubricant, oil, tallow, or packing, and needs no skilled attendance.

The Pulsometer will also raise water mixed with mud, sand, &c.

Sizes and Capacities.

No.	Steam Supply Pipe. Size.	Suction Pipe. Size.	Delivery Pipe. Size.	To Lift 15ft. approx. gals. per hour.	Approx. Price £	s.	d.
1	¼in.	1½in.	1in.	600	16	0	0
2	¼in.	2in.	1½in.	1000	22	0	0
3	½in.	3in.	2in.	2500	30	0	0
4	½in.	4in.	2½in.	4000	40	0	0
5	¾in.	4½in.	3in.	6000	50	0	0

"BILLABONG" AND "COO-EE" WINDMILLS.

"Billabong" and "Coo-ee" Windmills are representative of the cheapest pumping force—the wind. They are modern steel and iron mills—double enclosed gears, automatic oiling and governing. All surplus oil runs back to be used over again.

W.F.D. CENTRIFUGAL PUMPS.

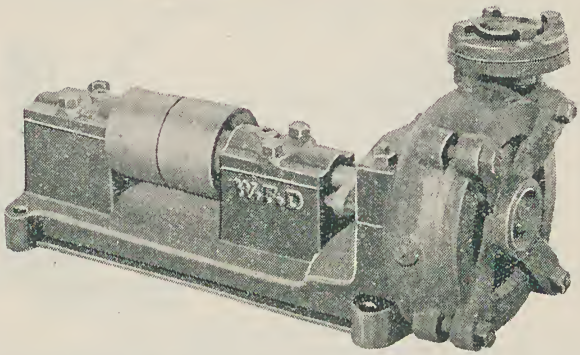
For pumping water, brine, offal, gravel, etc., of interest to farmers and station owners, sand vendors, factories and ice works, mines, quarries.

Prices vary according to pressure required, e.g., with water, height to be pumped, etc. Main pump is the Single Stage Pump, which is illustrated. *See page* 396.

Messrs. Smith & Gluyas are the sole agents and distributors who also carry large stocks of valves for all pressures in water and steam.

N.B.—W.F.D. Belt-driven Centrifugal Pumps up to 1½″ sizes are fitted with ball bearings. Sizes from 2″ upwards are fitted with long white metal oilring bearings and ball thrust races. Suction bends supplied with all pumps from 3″ upwards.

W.F.D. CENTRIFUGAL PUMPS.



Single Stage Belt-driven Pump. Style from 1in. to 2½in.

Size of pump, inches	Single stage £ s. d.	Size of pump, inches	Single stage £ s. d.
¾in.	4 5 0	4in.	14 10 0
1in.	4 5 0	5in.	16 10 0
1¼in.	5 0 0	6in.	25 0 0
1½in.	5 10 0	7in.	35 0 0
2in.	6 10 0	8in.	42 10 0
2½in.	9 0 0	10in.	70 0 0
3in.	11 0 0	12in.	82 10 0

Further details and prices on application direct to agent.
See Advt. page 32.

BILLABONG HYDRAULIC RAMS.
For Elevating Water.

The principle on which it works is that a larger volume of water having a certain fall will force, under certain conditions, a smaller volume of water to a higher point than itself.

In locating, a pit should be dug in which the Hydraulic Ram may be placed in order that it may not be affected by the frost. From the pit a drain should be arranged to carry off the waste water.

A Reservoir should be constructed, giving the greatest fall or head of water through the Drive Pipe to the Ram. (*continued.*)

About one-seventh of the water used can be raised and discharged at a height five times as high as the fall, or one-fourteenth part may be discharged ten times as high as the fall.

BILLABONG No. 5126.

Size of Ram	No. of gallons per minute required to operate Ram	Inside Dia. of pipes Drive	Discharge	Price each
3	1½ to 4	1″	½″	£4/15/–
4	3 to 7	1¼″	½″	£5/5/–
5	6 to 14	2″	¾″	£6/15/–
6	12 to 25	2½″	1″	£12/5/–
7	20 to 40	3″	1½″	£19/10/–

See Advt., p. 36.

PUMPS.

Suction Pumps should not be more than 20 to 25 feet above the surface of the water to be raised.

Approximate quantity of water raised per hour by ordinary lift pump.

9in. stroke and 25 strokes per minute.

Diam. of Pump. Ins.	Quantity raised Gallons.	Diam. of Pump. Ins.	Quantity raised. Gallons.
2	150	5½	1160
2½	240	6	1380
3	345	6½	1620
3½	470	7	1880
4	615	7½	2155
4½	775	8	2454
5	960		

Stewart & Lloyd Pipes and Tubes. Used for conveying liquids. Chutes, chimneys for columns. Mining struts, enclosures, railing, rollers, standards, posts, scaffolding, shear legs, &c.

" BILLABONG " WINDMILLS.

Enclosed Gear—Self Oiling.

Size of Mill	Mills only (no Towers)	Complete with 4 Post Painted Towers and Anchor Posts 20ft.	30ft.	50ft.
ft.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
6	16/5/–	24/5/–	27/17/6	36/5/–
8	18/7/6	27/5/–	31/10/–	42/10/–
10	27/–/–	37/15/–	42/15/–	58/–/–
12	34/7/6	47/10/–	54/17/6	74/–/–
14	40/15/–	57/–/–	63/15/–	85/–/–

See advt., p. 36.

COO-EE WINDMILLS AND TOWERS.

Size of Mill	Mills only (No Towers)	Complete with Four Post Painted Towers and Anchor Posts.		
		20ft.	25ft.	30ft.
6ft.	£ s. d. 11 0 0	£ s. d. 19 5 0	£ s. d. 21 0 0	£ s. d. 23 0 0
8ft.	13 15 0	23 5 0	25 5 0	27 10 0

Refer Advt., p. 36.

Steel Angle Ladders for Wells of Windmills, constructed of angle steel in sections 8ft. to 12ft.; the steps are riveted to the uprights. Price, per foot, 3/–.

Steel Steps, to bolt on alternate sides of delivery pipes of deep well pumps as a means for descending wells. Price, each 2/6.

THE HELIOWATT TIME AND RELAY SWITCHES FOR A.C. AND D.C.

Synchronous time switches types SYH and SYPH are driven by self-starting synchronous motors, working direct on the switch-gear in type SYH, whereas in type SYPH the motor works on the reserve spring of a pendulum clockwork. The pendulum is in gear with the motor and therefore oscillates in synchrony with it. If the current is cut off the pendulum gets automatically out of gear and the clock remains running for about 30-36 hours on the spring reserve.

Adjustment—Minimum interval between 2 operations 60 minutes.
Time setting by hand.
Number of poles—One, two and three.
Standard capacities—10 and 15 amps.
Standard voltages—
120 volts or 230 volts
Standard frequency—
50 cycles
} Other voltages and frequencies on request.

Standard number of operations—2 or 4 a day, 3 or more than 4 a day to specification.

Prices : SYH — £3 12 6 each nett.
SYPH £5 7 6 each nett.

The TZA type 3 min relay switch for stair lights is priced at £2 10s. 0d. nett.

The sole agents Messrs. A. Watt & Co. (Elec. Contractors, Importers and Suppliers) also carry the TYH type 3 min. permanent light automatic clock, Electric no running reserve—£7 10s. 0d. each, nett.

TYPH type 3 min. permanent light automatic clock, Electric Wound, with running reserve, £8 10s. 0d. each, nett.

The above are also obtainable at the leading wholesale firms—Refer to Advt., page 11.

ROPES AND BLOCKS

The strength of the best Manila ropes varies as much as rod or bar iron, portions of the same rope will sometimes vary 20 per cent. Exposure for two or three months to bad weather when the ropes are alternately wet or dry weakens them rapidly reducing their strength to one half. Tarring ropes also weakens them, the best preservative is to keep them dry and under cover.

Rope, Weight and Strength.

RULE.—For weight in pounds per fathom of three-strand hemp rope, square the girt and multiply result by .26.

Breaking strain in cwts., square the girt and multiply result by 5.6. Thus, a 3-inch rope would weigh 2.34 lbs. per fathom, and the breaking strain would be 50.4 cwts.

Example 3 x 3 = 9.
9 x .26 = 2.34, the weight in lbs. per fathom.
then 9 x 5.6 = 50.4 breaking strain in cwts.

Best Quality Manila Ropes.

Weight per fathom	14oz.	1¼lb.	2¼lbs	2¾lbs.	3–lbs.	4¼lbs.	5½lbs.	6½lbs.	7½lbs.
Girt in	2	2½	3	3½	4	4½	5	5½	6in.

WEIGHT AND STRENGTH OF SHORT LINK CHAINS.

	in.	in.	in.	in.	in.	in.	in.
Diam. of iron links	5/16	6/16	7/16	8/16	9/16	10/16	11/16
Weight per fathom ...	5½lbs.	8lbs.	11lbs.	14lbs.	18lbs.	23lbs.	28lbs.
Proof strain in cwts.	25½	36¾	51¼	65½	85	102	127
Diam. of links ...	¾	13/16	⅞	15/16	1	1⅛	1¼
Weight in lbs. per fathom	32	38	44	50	56	76	87
Proof strain in cwts.	147	177	200	236	268	334	408

To find the weight which ordinary short-link chains will bear with safety :—

Multiply the square of the diameter (reckoned in 16ths of an inch) by .035 ; the product will be the weight in tons. Thus, in the case of a ¾ inch chain ¾ = 12/16ths, and 12 x 12 = 144 ; then 144 x .035 = 5.04, say 5 tons—the safe working strain. If the squares are divided by 28, a similar result is obtained. Thus, 144 divided by 28 = 5.14.

Example.—½in. chain (8/16) = 8 x 8 = 64 x .035 = 2.24 tons which is the safe working strain of a half inch chain.

GALVANISED MILD STEEL WIRE ROPE.

Made of 7 Wires.

Suitable for Guy Lines, Signalling, Suspension of Telephone and Electric Cables, etc.

Size		Size of Wire used S.W.G.	Approx. Weight	Aggregate Breaking Strain in Tons of 2240 lbs.
Circ. in inches	Diam. in inches		lbs. per 100 ft.	
$\frac{3}{8}''$	$\frac{1}{8}''$	19	3.2	.34
$\frac{1}{2}''$	$\frac{5}{32}''$	$17\frac{1}{2}$	5.4	.60
$\frac{5}{8}''$	$\frac{3}{16}''$	16	8.2	.90
$\frac{3}{4}''$	$\frac{1}{4}''$	$13\frac{1}{2}$	14.8	1.62
$\frac{7}{8}''$	$\frac{9}{32}''$	13	16.9	1.86
$1''$	$\frac{5}{16}''$	12	21.7	2.37
$1\frac{1}{8}''$	$\frac{3}{8}''$	$10\frac{1}{2}$	29.8	3.26
$1\frac{1}{4}''$	$\frac{13}{32}''$	$9\frac{1}{2}$	37.0	4.06
$1\frac{3}{8}''$	$\frac{7}{16}''$	9	41.5	4.56
$1\frac{1}{2}''$	$\frac{15}{32}''$	8	51.3	5.62
$1\frac{5}{8}''$	$\frac{1}{2}''$	$7\frac{1}{2}$	56.5	6.20

Prices and further information refer p. 13

It is repeated bending over the pulley that breaks the crown strands of ropes. The shorter the pitch of the spirals of wire and the finer the wire, the more flexible the rope. The pitch of the individual wires may be from 2in. to 6in., and that of the strands 6in. to 12in. For flexibility the cores both of rope and strands should preferably be of hemp. Mr. Biggart, who tested the strength of the wire ropes used in the building of the Forth Bridge, found that the fracture of crane ropes was most often due to bending round small pulleys, and says " that 75 per cent. of the ultimate tensile strength of the rope may be taxed by bending alone. The pulleys over which the rope is to be run should not be less in diameter than five or six times the circumference of the rope. The larger they are the better.

STEEL WIRE ROPES OF AUSTRALIAN MANUFACTURE

—Best Quality—Galvanized—90 Tons per Square Inch

Circumference in inches	Diameter in inches	Weight in lbs per 100 feet				Guaranteed breaking strains in tons of 2240lbs.			
		6 x 7 Patent-Steel	6 x 19 Flexible	6 x 24 Extra Flexible	6 x 37 Special Extra Flexible	6 x 7 Patent-Steel	6 x 19 Flexible	6 x 24 Extra Flexible	6 x 37 Special Extra Flexible
1	5/16	18	18	16	18	3.5	2.9	2.8	3.0
1¼	—	25	25	24	25	5.1	4.5	4.3	4.0
1½	—	36	36	33	36	7.2	6.4	6.0	6.6
1¾	9/16	50	50	47	50	10.5	8.6	8.5	8.5
2	5/8	66	66	60	66	13.8	11.7	10.9	11.3
2¼	—	84	84	78	84	17.1	15.4	14.2	14.5
2½	13/16	102	102	95	102	20.1	18.0	17.2	18.2
2¾	⅞	123	123	113	123	26.3	21.7	20.5	22.2
3	15/16	145	145	134	145	29.7	25.6	25.0	26.6
3½	1⅛	198	198	188	198	40.8	35.6	34.2	34.0
4	—	263	263	239	263	54.5	47.1	43.6	45.3
4¼	—	295	295	275	295	61.7	51.7	50.1	51.6
4½	1½	369	369	344	369	77.4	66.8	62.8	65.3
4¾	—	409	409	378	409	84.9	72.2	68.9	72.7
5	1⅝	—	—	450	493	—	—	82.0	86.7
5½	1⅞	—	—	527	590	—	—	96.3	104.3
6									

NOTE.—The weights and strains stated are for ropes with main fibre core in centre of rope ; if made with main core of wire, the weights are increased one-ninth.

Prices and further information, *refer Advt. p.* 13.

SAFE WORKING LOADS FOR LIFTING GEAR.

Note.—Be sure of your weight and sling before you lift, take careful notice that the greater angle of your sling from the vertical the more load you are putting on it. The safe loads given are for each single leg of rope or chain. When used double or in any other multiple, the loads may be increased proportionally.

			When used st'ght	When used at 60° angle	When used at 45° angle	When used at 30° angle
Rough Steel Wire Rope. 6 x 37	Circ.	Dia.	Cwts.	Cwts.	Cwts.	Cwts.
If 6 x 24 is used, reduce load by 1/10. If Crucible Wire Rope is used, reduce load by 1/5. This table gives a factor of safety of 6.		¼	6	5	4	3
		⅜	14	12	10	8
		½	23	20	17	12
		⅝	41	35	30	23
		¾	56	47	39	26¾
		⅞	82	71	60	46
		1	100	86	77	54½
		1⅛	130	110	92	68
		1¼	170	142	120	92
		1⅜	190	164	136	105
		1½	217	185	160	112
Best B.B.B. Short Link Iron Chain. This table gives a safe load of 1/6 of actual breaking load.		¼	5½	4½	4	3¾
		⅜	11	9	7¾	5½
		½	21	18	15	11
		⅝	36	30½	25	18
		¾	49	42	34¾	24½
		⅞	67	57½	46½	32
		1	85	72	59	42
		1⅛	107	91	75	53½
		1¼	134	114	94	67
		1⅜	170	139	112	89
		1½	214	188	160	116
Manila Rope. This table gives a factor of safety of 8.	1	⅜	1.6	1.4	1.2	1.0
	1½	½	2.75	2.4	2.0	1.5
	2	⅝	4.5	3.2	2.6	2.25
	2¼	¾	5.5	4.5	4.0	3.0
	2¾	⅞	7.8	7.0	6.0	5.1
	3	1	9.1	8.1	7.1	6.8
	3½	1⅛	12.25	11.0	9.75	7.75
	3¾	1¼	14.0	12.0	10.75	8.5
	4½	1½	19.6	17.0	15.0	12.0
	5½	1¾	28.5	25.5	22.5	17.5
	6	2	33.5	30.5	26.5	20.5
	7½	2½	48.5	42.5	37.0	30.0
	9	3	68.0	60.0	52.0	41.0

PRICES OF HEMP ROPE.

In Coils—120 Fathoms.

No. 1 Best Manila	under 1″ dia.	105/–	over 1″ dia.	98/– cwt.
No. 2 Manila	,,	93/–	,,	86/– ,,
No. 1 Best N.Z. Flax	,,	87/–	,,	80/– ,,
No. 2 N.Z. Flax (2nd qual.)	,,	77/–	,,	70/– ,,

Tarred Bolt Rope—Yacht Quality under $\frac{3}{4}$″ dia. .... 161/– cwt.
$\frac{3}{4}$″ to $\frac{7}{8}$″ dia. .... 152/– ,,
1″ and upwards .... 145/– ,,

PULLEY BLOCKS FOR MANILA ROPE.

	4″	5″	6″	
Single	7/6	12/6	15/–	each.
Double	11/6	19/6	22/–	,,
Treble	15/–	25/–	30/–	,,

"STAR" ROPE HOISTS.

Safe and durable. Ideal for handling pumps, erecting windmills, lifting logs, stumps, etc. Also very useful in foundries, factories and warehouses. Made of best malleable iron and steel and fully warranted. Elevates, lowers, locks and unlocks with one rope only.

No. 42—Capacity	1500	pounds	... ...	52/6 ea.
32 ,,	1250	,,	... ...	40/– ,,
22 ,,	750	,,	... ...	32/6 ,,
2 ,,	500	,,	... ...	17/6 ,,

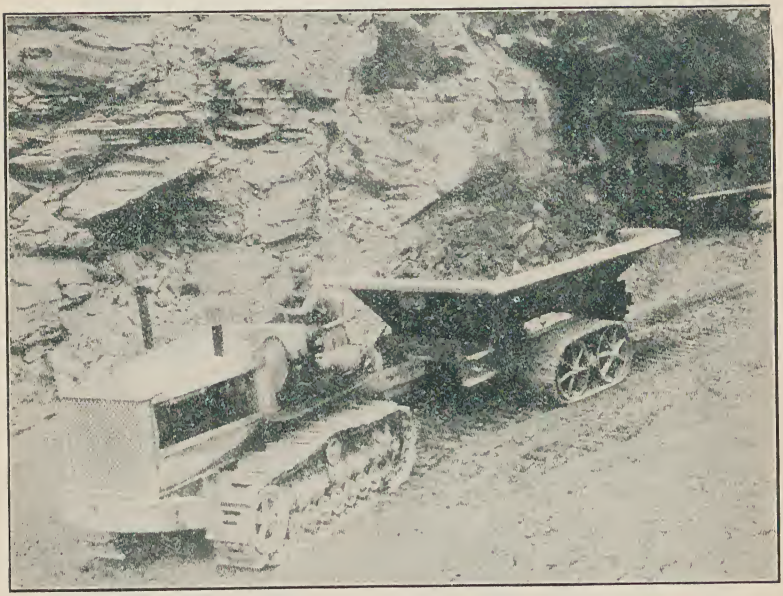
Prices do not include rope.

60 feet of rope is required to lift a load 10 feet.

Circular Pit or Building Crane, to swing a complete circle, to raise 2 tons, may be made with a 5 ton crab winch, crane post (hardwood 35ft. by 9in. sq.), Oregon jib, 25ft. by 9in. by 6in., with iron sheaves or wheels let into crane post and jib, $\frac{1}{2}$in. chain, four 1$\frac{1}{2}$in. girt galv. wire rope guides, each 66ft. long, also 20 fathoms 2$\frac{1}{2}$in. girt best steel flexible wire rope, iron fittings, labour, &c., complete at a cost of about £85.

For information on Architectural, Civil, Mechanical, Electrical and Structural Engineering Courses, refer to *Advt., page* 35.

ROADS AND STREETS



COUNTRY ROAD MAKING.

Macadamised roads require first of all a solid and drained foundation and a surface rolled as soon as the broken metal is laid to uniform grades and slopes.

Rolling before traffic regulates the life of a road.

ROAD CONSTRUCTION.

Notes from above by S. J. Hunning, I.E. (Aus.).

The cambered crown of all roads be standardised to a cross fall from centre to side of road 2 inches in 10 feet, and the width of tyre of vehicles to proportionate to load to be carried, with axle bent down at ends to throw the wheel inclined inwards at bottom.

Extract from letter by S. Gordon Moore, Shire Engineer, Bendigo, Vic.

Reinforced bluestone concrete base with a btuminous surface is considered a first class road. Formed rolled macadam with hot bitumen to fill spaces between stones is 2nd class construction for heavy and rapid wear for city or suburban roads.

Main reinforced blue metal in 1923 concrete roads, 8 inches thick; large areas, electric machine mixed and motor delivered material; cost, from 25/– per sq. yd.

Wood blocks and cement, using old blocks, 27/6 per yd. Now superceded by bluestone concrete and surfaced.

CONCRETE ROADS AND PAVEMENTS

A FEW HINTS.

It is essential that concrete should be kept damp during its hydration process. This is usually done by covering the concrete with sand and bags and keeping it wet for a period of from 7 to 28 days. This is called curing. The Sisalkraft method is popular—economical—and certain of good results. The manufacturers of Hesheen—a waterproof reinforced paper—have patented a process which consists of placing a layer of Sisalkraft over the concrete immediately the initial set has taken place. The material being water-proof prevents the evaporation of the original mixing water and sets up condensation on the slab surface itself. The following is a comparison of 3 different methods.

(1) Complete immersion	4.950	Compressive Strength
(2) Sisalkraft method (without wetting)	4.880	at 28 days in pounds
(3) Under set sand, kept moist	3.500	per square inch.

Complete immersion though undoubtedly the best is seldom possible—Hesheen costs 3d. per sq. yd. in rolls 5ft. wide x 100 yds. in length, and can be used up to 5 or 6 separate applications.

See Advt. p. 14.

Sub-Grade Lining.—It is only in recent years that the value of an efficient sub-grade lining for concrete has been realised. A reliable material which will not fracture during the placing and tamping of the concrete prevents the loss of cement paste into the subsoil which causes honeycombing of the lower portion of the concrete. It also prevents contact with impurities such as vegetable matter, acids, etc., which would be detrimental to the concrete. It is particularly valuable over loose sub-fill. Hesheen is used for this purpose—Costs 3d. per yd.

See Advt. p. 14.

JOINTING. "GIVANTAKE" ASPHALT EXPANSION JOINTING. Specially designed for the purpose of taking up expansion and contraction and maintaining watertight joints in concrete roads and pavements. Sizes, made to any size and specification.

Further particulars Ormonoid Roofing and Asphalt Co. *See Advt. p.* 20.

COMPARATIVE CONSUMPTION OF GALLON OF PETROL.

Various Road Surfaces.

Extract on Road Problem by State Highway Dept., Illinois, U.S.A.

Engineering experiments made by Iowa State College shows the better type road materially decreases the consumption of petrol as per the following averages per gallon of petrol. Surface: Earth, 14 ton miles; Bitulithic, 28.5; Gravel, 21; Brick, 29.7; Concrete 31 ton miles per gal.

WOOD BLOCKING, GENERAL REMARKS.

Average, 50 blocks to square yard, close packed, ⅓ gall. tar dipping, $^2/_5$ gall. dressing tar per square yard,

Cost tar, treated, –/8 per gal. Sydney.

Tar at gas works, 6d. per gall.

Floating Concrete Surface Roads. *See* Table Concrete Section, About 8 cub. ft. sand 4 bags cement covers 16 sq. yds. ½in. thick.

See Asphalt Section for Tar Paving.

Road Bed Steel Reinforcements. *See* Concrete Section.

CONCRETE ROAD CONSTRUCTION.

In recent years the construction of concrete roads and surfacing on a concrete base in large areas has developed economical methods that will produce the greatest mileage of pavement in the least time and for the least money. Many shire engineers have adopted the system of a central proportionate plant, hauling the dry batches in 1½ or 2 c. yd. batch boxes on trolley trucks by a 24in. gauge portable track alongside of road, to a large mixer and distributor.

For embankments, the side dump car, with side doors working on 2 feet rail or narrow gauge track and excavator or steam shovel, for "cuts" are now used for excavating work, viz., railroads, aquaducts, viaducts, bridge approaches, dams, reservoirs, brickyards. Size 1½ to 2 yards, trucks of 24in. gauge, 4 to 5 cu. yd capacity, truck 36in. gauge, but the smaller size are easily handled if it gets off the track on a soft "fill" or embanking.

CONCRETE KERBS AND GUTTERS, 1937.
Wages Award, 2/0½.

Reinforced Gutter Crossings—

6in. x 3ft. 8in. long, per ft. run, 2/9.

15in. x 9in. x 3ft. 8in. long, per ft. run, 3/9.

Reinforced Troughing—

22½in. dia. x 14½in. deep x 4ft. 6in. long, per ft. run, 2/6.

Extra for ends, 6/– each ; standards, 12/– each ; plugs, 3/– each.

REINFORCED CONCRETE GUTTER CROSSING SLABS.

9ft. bridge, £3/3/– ; 7ft. bridge, £3/10/– ; 12ft. bridge, £4/4/– ; 15ft. bridge, £5/5/– ; 18in. gutter x 3½in. thick x 3ft.

MUNICIPAL KERB AND GUTTERING.
Per North Sydney Road Making Council.

Actual practical working method, with hand machine mixer.

½ cement bag or 3 shovels (No. 5 shovel) cement.

5 shovels of sand.

9 shovels ¾in. blue metal.

or to each feed 2-4 gal. kerosene tins = 1 bushel.

Ordinary navvy barrow will carry 2 cub. ft. or 12 shovels of No. 5 size.

1 cub. yd. of concrete will make 40ft. of gutter 12in. x 6in.

Before mixed, 8 cub. ft. will only make 6 cub. ft. concrete.

3 bags of cement mixed 3 : 5 : 9 will make 40ft. of 6in. x 12in. kerb or 4in. x 18in gutter, kerbing 7in. x 13in.

The best sand for concrete finish is the " wash " sand stone sand.

The coarser sand (crushed stone), being hungry, allows the water to run through the concrete too quickly and leaves a rough surface. Better to mix Sydney fine blown sand for a " fatter " mixture and a smooth result, or mix a small quantity of hydrated lime.

BENDIGO MUNICIPAL BUILDING MATERIALS.

Harcourt Granite Building Stone, price 7/– per cub. ft., F.O.R. Melbourne, for stones up to 50 cub. ft.

Add 6d. per cub. ft. for every 10ft. or part of 10 cub. ft. over 50 cub. ft.

Over 12ft. long, add 6d. for every 2ft. or part thereof.

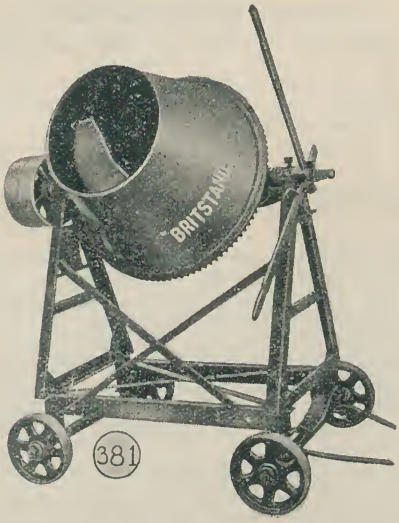
Road Tarring, labour, carting, spreading, sanding, including sand which costs nothing, but cartage, say 3/– per load, average 7/8 per sq. yd.

Tar distilled costs 1/4 per gal., covering 4 to 6 sq. yds. Bitumen or Asphaltum costs 1/6 per gal. and covers 9 to 11 sq. yds. per gal.

Concrete Slabs for Culverts, Manholes, etc.

3ft. 2in. long, 1ft. 7in. wide, 3½in. thick cost 12/2 to make.

3ft. 2in. long, 1ft. 7in. wide, 2¼in. thick cost 11/3 to make.



" BRITSTAND " HAND MIXERS—APPROX. £32.

Hand wheel or pulley as required. Stationery models or 4 wheel transport. A mixer of 3½ ft. capacity with a big output, but easy for one man to work. Write for literature.

CONCRETE SLABS FOR CULVERTS, MANHOLES, ETC.

3ft. 2in. long. 2ft. 1in. wide, 3½in. thick cost 13/3 to make.
3ft. 2in. long, 2ft. 1in. wide, 2¾in. thick, cost 11/1 to make.
All are reinforced with ¼in. rods spaced 4½in. both ways.
Sandstone Kerbing 8in. x 18in., per lin. ft., 7/–.
Sandstone Guttering, 21in. x 9in. per lin ft., 8/–.
Trachyte Kerbing, 8in. x 18in., per lin. ft., 8/–.
Trachyte Guttering, 21in. x 9in., per lin. ft., 8/9.

Extract from letter 20/10/37 *from Gordon Moore, Engineer-in-Chief for Bendigo Shire.*

I enclose information about Rust Proofing steel reinforcements and water proofing concrete that may be of interest to Shire Engineers generally. **Killrust roof paint** destroys rust, and outlasts red oxide paint; it offers less resistance to corrosive fumes. Covering capacity about the same as other good quality oil paints about 600 to 700 square feet to the gallon, price 19/6 per gal.

In one colour, for gal. iron and external iron work, not suitable for treating ironwork that is continually immersed in water. Manufacturers, Bulimba, Brisbane. Phone FU 7804 Sydney. Central 9455 Melbourne.

INTEGRAL WATERPROOFINGS.

Mixing with Cement per cubic foot bag.

Nonporite No. 3—Cement (below ground work, floors, &c.), 1 quart per c. f., 13½lbs. gal., 15/– per gal. **Nonporite No. 3. BA.**—Waterproof and Chemical Resistant., 3 pints per c. f., 15½lbs. gal., 13/– per gallon. **Nonporite No. 2, Paste.**—Waterproofer for Cement, 1 quart per c. f., 9lbs. gal., 15/– per gal. **Nonporite No. 2, Powder**—Waterproofer for Cement, 2 to 5 lbs. per c. f. bag of cement, 7lbs. gal., 1/4 per lb. **Nonporite Mortar Pointing Paste**—Waterproofer for Cement Mortar Pointing, 1 gal. per c. f. bag of cement, 9lbs. gal., 7/6 per gal. **Permelastic (Black) "AA"** (Acid proof and Waterproof)—Bituminous Primer, 150-200 sq. ft. per gal., 8¾lbs. gal., 9/– per gal.; Thick Brush Coat, 100 sq. ft. per gal., 10lbs. gal., 9/6 per gal.; Trowel Coat, 33 sq. ft., $\frac{1}{16}$in thick, 12½lbs. gal., 9/6 per gal.; Caulking Consistency, 80 ft. of ½in. joint per gal., 14lbs. gal., 11/– per gal.

It is evident that a surface of asphalt or tarred cushions for cement paths prevents wear and tear.

The Anzac Parade in 10 years shows no depreciation in thickness, surface becomes corrugated, but not broken, due probably to the presence of water underneath.

This locality was formerly the source of Sydney's Botany water supply, 1880, as seen in Centennial Park lagoons. Also the "Billy" and "Nanny" waterholes are all self filling.

Tarred gravel concrete, clean river gravel graded from 2½in. down and premixed with distilled tar, laid and rolled when cold, forms a reliable road for mild traffic. Maintenance and cost is considerably less than concrete.

STREET SANITARY DRINKING FAUCET.

For water pipe, complete with china ball, £2/5/–.

Sanitary drinking fountains with c.i. pipe and bowl flange, bolting to floor, gal. iron bowl, £5/5/–.

C.I. drinking pedestal fountain, 30 inches high, 14in. bowl, N.P. bubbling faucet, £7 ; pedal valve, £9.

Vitreous china pedestal and drinking head, with gal. iron waste to floor, self closing valve, £16/10/–.

Ditto, china bracket for wall, push button valve, £10/10/–.

MUNICIPAL ROAD PLANT.

All Steel Road and Contractors Plows.—Britstand unbreakable manganese steel beams, making distortion impossible.

2 to 4 Horse,	weight 165 lbs.	Price	....	£14 10	0
2 to 6 ,,	,, 200 ,,	,, ...	....	£15 10	0
2 to 8 ,,	,, 250 ,,	,, ...	....	£16 10	0

Drag Scoops.—All steel construction with large renewable skid plates beneath bowl. 3 cubic feet capacity, £3/15/– to 10 cubic feet capacity, £7/10/–.

Buck Scrapers.—All steel with renewable skid plates and dump-shoes. Used for levelling ground and forming ditches, etc. 4ft. mouth, £14, 5ft., £15, 6ft., £16, 8 ft., £20.

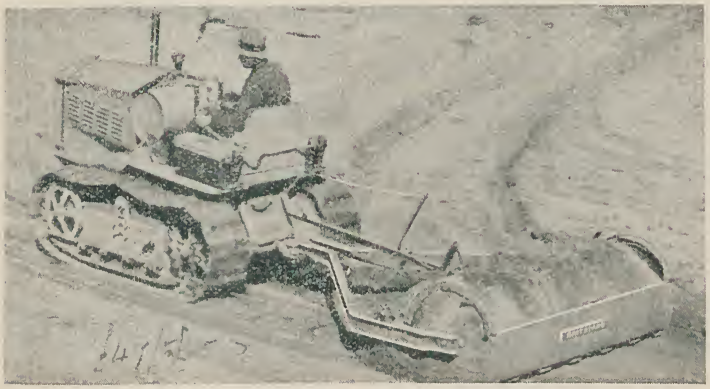
Rotary Scoops.—2 wheels. Heavy duty for road work and can spread to grade with precision. Capacities up to 100 cubic feet.

4 Wheel Scoops.—Automatic end gate retains the full load in loose soil. Capacities up to 34 cubic feet.

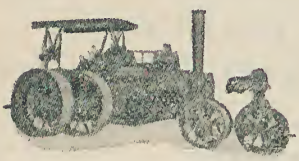
Further details on application to British Standard Machinery Co. Ltd., 65 York Street, Sydney.

GRADERS.

British Steel Grader is a light road machine. Price on Application.



Eclipse Reversible Road Grader.

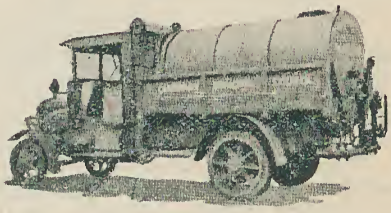


Tractor, Roller, Scarifier and Stationary Engine in one. As Tractor, 7½ tons, capable of tractions 8 to 10 tons, 6 m.p.h.; Roller, 10 tons.

Prices on application.

STREET WATERING GEAR.

Removable Tanks, with the necessary street watering equipment, are available for every type of Garrett. These can be attached or removed in a very short time. The photograph shows a Municipal Council's Waggon. Price, £1,600.



Street Sprinklers, 1,200 gal. tank, Newcastle and Sydney City Councils, will sprinkle 4¼ miles 60 ft. wide spread in 30 minutes.

CONCRETE AND ITS USES.

The Australian Cement Manufacturers' Association supply free of charge to those who are interested, illustrated booklets dealing with Concrete and its many uses, viz. :—

Method of Making Concrete.
Concrete Fence Posts.
Concrete Paths and Floors.
Concrete Walls and Steps.
Concrete Tanks and Wells.
Portland Cement Stucco.
Portland Cement Plaster.
Portland Cement Textures.
Concrete Silos.
Concrete Mixing made easy.

Concrete Blocks, Bricks and Slabs, etc.

See Advt., page 28.

For information on Architectural, Civil, Mechanical, Electrical and Structural Engineering Courses, refer to *Advt., page* 35.

Primary Cost of Different Types of Road Pavements

HAND LABOUR, 1936 Conditions, 2/2 to 2/6 per hour Labour.

MATERIAL—Cement, 5/– per paper bag ; Sand, 7/–.

TARRED METAL PAVEMENT.

	Primary Cost		Maintenance.	
	s.	d.	s.	d.
15in. excavation, in old macadam ...	6	7		
9in. S.S. Ballast, 25 years	4	8	0	5.4
6in. Tarred metal and Segs, 5 years	8	10	1	9.2
	20	1		
Maintenance and Tarpainting, 5 years			0	11
			3	2

TAR CONCRETE PAVEMENT.

18in. Excavating in old macadam ...	7	11		
9in. S.S. Ballast, 25 years	4	8	0	6.
6in. Tarred Metal, with 15 per cent. bitumen, 10 yrs.	9	0	0	10.8
	21	7		

MACADAM.

	Cap. cost.		Cost per sq. yd. per ann.	
	s.	d.	s.	d.
19in. Excavating in muck	7	0		
9in. S.S. Ballast, 25 years	4	8	0	5.6
6in. Metal and Segs, 5 years ...	6	9	1	4.2
	18	5		
Average cost of maintenance and Tarpainting...			1	0
			2	10

BITUMINOUS ASPHALT PAVEMENT.

	s.	d.
21in. Excavating	9	2
2in. Ash filling	1	0
4in. S.S. Ballast	2	3
9in. Concrete paving ...	18	9
No. 9 B.R.C. Fabric ...	3	4½
2in. Bituminous Asphalt, at £5 14s. a ton	11	6
	46	0½

Maintenance after 5 years' life 2/3.6

NEUCHATEL ASPHALT PAVEMENT.

	s.	d.
21in. Excavating, in existing macadam	9	6
2in. Ash filling	1	0
4in. S.S. Ballast	2	3
9in. Concrete Paving ...	19	0
No. 9 B.R.C. Fabric ...	3	6
2in. Comp. Asphalt ...	16	6
Price per yard	51	9
Maintenance	2	0½
First cost	8	3
Comp. Asphalt	7	6

SCARIFYING AND REFORMING existing macadam

... ...	3	0
2in. Bituminous Asphalt ...	11	6
	14	6
Maintenance to under surface	0	1½
Ditto to Asphalt surface ...	2	3½
Total per square yard ...	2	5

"BRITSTAND" CYLINDRICAL DRUM MIXERS.
Available in stationary or portable outfits with automatic measuring tank of special accurate pattern.

CONCRETE GATEWAYS 6in. THICK (Complete). (Per sq. yd.).

	s.	d.
Metal and Scgs., .20 ton at, 15/6	3	1
Nepean Sand, .05 ton, at 12/–	0	7
Cement, .80 bag, at 6/– ...	4	10
	8	6
Plasterer, .80 hours, 3/1⅜ ...	2	6
Conc. labourer, .80 hours, 2/4⅜	1	11
Carter, .80 hour, 3/2½ ...	2	7
	15	6

GATEWAYS. (Per sq. yd.).

	s.	d.
4in. thick	11	6
6in. thick	15	6
8in. thick	19	6

ESTIMATED COST OF WORKS.

Based on the following rates of wages per hour.

Labourers, 2/3; Concreters, 2/4⅜; Tar Paviors, 2/4½; Carters, 3/2⅛.

Excavation in Muck.

Labour, 2.44 hours at 2/3, 5/6; Haulage, 1½ miles, 6/6; Supervision and incidentals, 1/– = 13/– per cubic yard.

4/3 per sq. yd. 12in. deep = ½ load; 1/5 4in. deep = 1/6 load; 4½ in. deep = .04 load; 2/1½ 6in. deep = ¼ load.

Excavation in Metal and Ballast.

Labor, 7/–; Toolsharpening, 9d.; Haulage, 1½ miles, 6/6; Supervision and sundries, 1/6 = 15.9 per cub. yd.

5/3 per sq. yd. 12in. deep; 1/9 4in. deep; 5¼d. 1in. deep; 2/7½ 6in. deep.

	s.	d.
Concreting, 1.6 hours at 2/3½	3	8
Floating, .36 hours at 2/6¼...	0	11
Watering, .26 hours at 2/2⅛	0	7
Hauling material 2 miles, .875 per T.M. at 3/1⅜ ...	2	9
Metal, .13 tons per sq. yd., at 16/–	2	2
Screenings, .13 tons per sq. yd., at 18/–	2	4
Sand, .16 tons per sq. yd., at 13/3	2	2
Cement, 1.16 bags, at 6/– ...	7	0
	21	7

Haulage of Materials.

(by Carters drawing one way only hired Carters), at 3/2½ per hour.

Loading and dumping, 10d. per ton load or 1/3 per cub. yd. of muck; Haulage per ½ mile, 1/2 per ton load, or 1/9 per cub. yd. of muck.

9in. Ballasting with Sandstone.

Materials, at 5/– per load, 1/8; Packing ballast, 1/–; Haulage, 1½ miles, 1/6; Rolling, 4d.

For information on Architectural, Civil, Mechanical, Electrical and Structural Engineering Courses, refer to *Advt., page* 35.

METHOD FOR SECOND CLASS ROADS.

By E. S. Siddeley, C.E.

A good foundation is assured, a max. depth of 6in. of gravel is sufficient.

Where no ballast is used, it is advisable to lay the gravel an inch or two thicker than above.

After laying to desired depth—with slopes formed all large lumps broken, well water, using either a water cart or street hose, encourage the traffic on the gravel.

Do not be afraid of traffic on the loose gravel, it is most helpful in consolidating the material.

When sufficiently dry to be rolled without picking up on the roller, roll same, commencing at sides and finishing off on centre, until all stones have been covered and there is a perfectly smooth surface for traffic.

When thoroughly dry and consolidated, paint with tar and repeat in 4 months time.

A good second method of laying, viz., spread the gravel to desired thickness as above, water same, and allow the ordinary traffic on the loose material for a few days. Use one gallon of tar to cover 3 square yards, after sanding.

The roller should be brought along and the street ironed into shape, rolling the sides first and finishing off on the centre.

This way of using tar ensures it going in deeper than if merely tar painted and makes a most satisfactory job.

Teralba Gravel goes 21 cu. ft. to the ton. Average price, run of quarry, 4/– per ton at quarry. One inch and under for footpaths etc., 5/2. One ton covers 28 square yards one inch thick. Any other information, enquire 43 Margaret Street, office.

BLACK SOIL OF THE PLAINS OF NEW SOUTH WALES.

If cured, base is laid in position when dry, on a coating of tar to keep the bottom moisture from penetrating upwards.

With the "camber" and "grade" rolling thoroughly done, before applying, the surfacing, tar and ironstone gravel finish.

It will then make a third class road where the traffic is not too heavy, being a substitute for a concrete base.

Water is kept from penetrating, and a good camber or weathering is given both top and bottom, and it will make a good class road base material if well rolled and compressed.

Note the cut-back natural roads in dry weather after being rolled hard when damp by the 20 ton wool waggons with large 8 feet diameter wheels, and 6 inch broad tyres, when dry the surface is intensely hard, and almost as hard as rock.

Also the incomparably hard **ironstone gravel** ridges throughout the country when dry and consolidated by traffic.

Water soakage is the cause of most road troubles, and the enemy of **all foundations.**

Fifty years ago Chas. Mayes, C.E. (my father) engineered North Annandale's broad streets, with plenty of " side-pitch " to drain the formation of same on ordinary clayey soil, which lasted under general waggon and cart traffic 2 years before being macadamised.

Plenty of drainage and get away of water is essential always.

Thirty years ago, I (C. E. Mayes), marked out and constructed 17 miles of cross country road from Cox's River to Kowmung River, for **Cedar Getters,** ten to one grade max., with a matrix of friable shale for a distance collectively of 2 miles of 15 feet wide cuttings.

The hills excavated to half way 7 feet V shaped and cast debris outwards, to rest against large tree logs (felled on site) and tied in with cross-ties " pig-sty " fashion, backed up with " spalls " and ballast of large stones rolled down hill from above.

The drainage was out-to-in with hollow log culverts at intervals for get-away water.

This road stood cedar waggons, 2 ton bullocks power traffic for 10 years without much repair, which it now wants. It is still used for horse travellers, 1938. 8/– per day per man and keep 12 weeks contract and cost £420. **All Manual Labour.**

My theodolite being delayed, I sighted with an effective straight swamp reed suspended at 10 to 1 angle by strings hung on a forked stick with sharpened end to stick in the ground, while " sight " was taken, **no screws or verniers** to adjust. Always ready at 10 to 1 slope, being accurate enough and **quick** for road making.

SEPTIC TANKS

There are many different systems dealing with the above matter varying not only in detail of construction, but claiming more or less efficiency as regards results and other advantages in price and compactness.

I append the following extracts from different writers of these systems.

BIOLOGICAL TREATMENT OF SEWAGE.

Sanitary Installation Coy. of Australasia, 143 *Major Bay, Concord, Sydney and Adelaide.*

Hospitals and large establishments, plant for 50 persons, from £35.

SEPTIC TANKS

Inside the tanks are fittings arranged to control the scum, which is formed upon the surface of the liquor in the tank by the bacteria, and which is of the utmost importance to the efficient working of the system. The bacteria utilised is that known as *Bacilli Coli Communis*, together with another specie known as *liquifaciens*. This scum formation has a twofold purpose. First, it is used by the bacilli to hermetically seal up the inside of the tank, as oxygen is fatal to their existence. Secondly, it forms the culture upon which the colonies thrive. It is therefore of the utmost importance in the design that no part of the tank should interrupt the unbroken formation of this scum, and that no inrush or outflow should cause an agitation or crack of the scum.

After the sewage, in a broken state, passes into the tank, large numbers of the *colonies* in a very rapid progress pass from the scum down through the liquor and immediately break up all the organic compounds, reducing them to their original elements, and the colonies then return to the scum.

The liquor which passes from the tank is then quite clear, but contains cellulous and other putrefactive substances, such as albuminoids in solution.

It is then further treated in special patent bacteria beds, consisting of distributors and a pebble media to increase the working surface.

After the bacteria beds have been working for a short period there is formed on the surface of each pebble a coating of shiny growth. When dried it forms a stiff jelly containing masses of bacteria which rapidly absorb all the oxygen. It is this function that is used in the bacteria beds to procure the excellent effluent which is obtained, and the bacteria which you observe from the above, while they are the same species as cultured in the tank, thrive in the presence of oxygen in a different state, viz., *Aerobic*. As the effluent from the tank passes over the jelly growth on the stones, the putrefactive substances held in solution are subtracted, and the water left entirely free from any matter that will prove putrefactive even under incubation at a high temperature for long periods.

The result is that waste water is produced in which gold and silver fish are said to thrive without showing any sluggishness in their movements. This is admitted to be the highest scientific test any effluent could be submitted to.

Septic Tanks Installation Ltd., Coglin St., Brompton, Adelaide

Prices, approx., Sewage Tank and Bacteria Bed installed complete, within 20 feet from building.

For 3 persons, £45; 7, £55; 10, £64; 20, £80.
Dubbo Hospital, 5 years, upkeep £1 per annum.

The use of disinfectants or deodorants is wrong, for it results in the destruction of those very forms of life which Nature has provided as scavengers; owing to the rapidity of action of this system, a small amount of disinfectant entering the system will upset it.

Buckland's guaranteed tanks only to suit families of five or six persons, £9/8/–; from 8 to ten persons, £11/15/–, ex factory. Buckland's Patent Grease Trap, 35/–.

SEPTIC TANKS AND AERATORS.

By "Monier" Concrete Co. System.

Now the biological treatment consists in the passing of the sewage through the *Septic Tank and Aerator* so that their respective cultures of the micro-organisms may come into contact with and subject the sewage to the process of purification. If the effluent is to be discharged close to human habitation or likely to drain into watercourses, it is necessary to pass the effluent from the septic tank through an aerator to be aerated and brought into contact with areobic micro-organisms for further purification.

General Points.

The most suitable position for septic installations compatible with local conditions must be selected to enable the discharge of the effluent. If the ground has a slope, the installation should be arranged so as to discharge the effluent at the surface of the ground, where it may run into surface drains to soak into the soil or be used for irrigation purposes. If the ground be *flat*, the installation must necessarily be underground and the effluent must be discharged into underground drains of *rubble* or *perforated pipes* to soak into the sub-soil or to be collected into a tank if required for irrigation purposes, in which latter case the liquid will have to be lifted by mechanical means to the surface of the ground.

To ensure the proper working of the installation, the discharge of the W.C., the house and kitchen slops, bath and laundry water, should all pass through the same. A too-concentrated or too-diluted sewage are all unsuitable.

Disinfectant must be strictly excluded. Only *sanitary paper* should be used in the W.C.

The size of the drain pipe leading to and from the septic tank, we would recommend 6in. drain pipes for the former and 4in. for the latter. Care must be taken that nothing passes into the drain pipes larger than is permitted by the gratings provided at the gullies, also that the latter be cleaned out periodically.

Rain water from roads and surface drainage from yards, &c., must be excluded from entering tank, and a *grease trap* installed to intercept fatty matter till cooled ready for removal at frequent intervals.

Agents: J. B. Reinforced Cement Co., 659 Darling St., Rozelle, Sydney.

MONIER SEPTIC TANKS AND AERATORS.

Quotations on truck Alexandria, or on any City Wharf.

No. of Persons	No. of Tanks	Cost of Tank	No. of A'ators	Depth of A'ator Bed	Cost of Aerators	Total Cost of Installation
		£ s. d.		ft. in.	£ s. d.	£ s. d.
3	1	9 0 6	1	4 6	18 13 0	27 13 6
5	1	10 9 6	1	4 6	18 13 0	29 2 6
6	1	11 17 6	1	4 6	18 13 0	30 10 6
8	1	13 11 0	1	4 6	18 13 0	32 4 0
13	1	14 7 6	2	4 6	37 6 0	51 13 6
17	1	16 12 0	2	4 6	37 6 0	53 18 0
23	1	19 5 0	2	4 6	37 6 0	56 11 0
29	1	21 6 6	3	4 6	55 19 0	77 5 6
35	1	24 19 6	3	4 6	55 19 0	80 18 6
46	2	38 10 0	4	4 6	74 12 0	113 2 0
57	2	42 13 0	6	4 6	111 18 0	154 11 0
70	2	49 19 0	6	4 6	111 18 0	161 17 0

SANITATION FOR LOCALITIES WHERE THERE IS A SCARCITY OF WATER.

The "Somen Chemical System," tested and passed *by the N.S.W. Board of Health.* This consists of a pedestal seat with hinged lid, mounted on an iron tank. The standard model is 3 feet square by 18 inches in depth, containing 50 gals., but the size and shape can be made to suit requirements of individual cases.

Between the pedestal and the solution in the tank there is a cylinder with agitators attached to each end. This cylinder acts as a carrier,

as it revolves gradually with each closing of the seat lid by a rachet wheel, and thus is constantly being washed and sterilised in the chemical solution. As the cylinder leaves the solution it is brushed by a rubber band, which assures its being perfectly cleaned. The agitators at each end of the cylinder keep the solution mixed up as required. The mechanism is simple and effective.

The contents of tank are emptied by simply opening a valve and allowing the liquid to escape into the affluent drain or covered pit provided for the purpose. The valve is provided with an overflow pipe which regulates the level of the liquid in the tank, but as no water is used except sufficient to make the solution, only a small overflow occurs, if any, during the periods between each recharge, which is done according to frequency of use. A necessary vent pipe from the tank is taken up above the roof which the system is installed under to carry away any fumes. The charging of the tank once in 3 to 6 months is as simple as the emptying.

The price of the system in £20 in Sydney. Installation varies, but generally the cost is approximately £1.

Agents: *Home Sanitation Ltd.*, 56 *Young St.*, *Sydney.*

MOIR'S AUTOMATIC CHEMICAL SEWERAGE SYSTEM.

Is similar in principle to the Somen System. The rachet wheel for stirring the effluent is controlled by opening and shutting door of the closet. The W.C. seat is directly over the vented curved top tank with 4 G.E. drain pipes to a leaching pit, 10ft. long x 2ft. 6in. x 2ft. 6in. buried 2ft. underground.

The above systems were demonstrated at Sydney Agricultural Show, 1937—C.E.M.

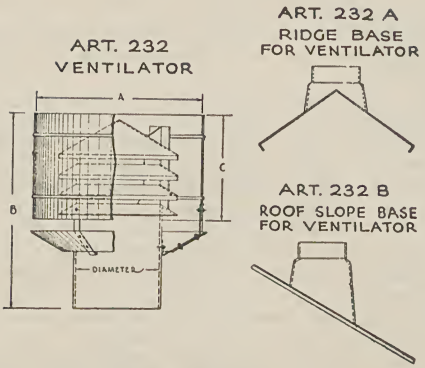
Varied prices on application, from £18 upwards.

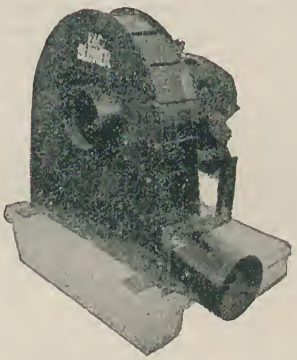
Somen Sanitary Systems, 143 *Major Bay Road*, *Concord.*

Small Cottage Systems, ready made on rail, Buckland Concrete Works, 16 Central St., Marrickville, N.S.W.

5 persons, £9/13/–; 8 to 10 persons, £11/15/–.

VENTILATING
or Air Conditioning





CENTRIFUGAL FANS

Either

ELECTRIC - COUPLED or BELT - DRIVEN
for AIR CONDITIONING, VENTILATING.

It is now used in Stores, Hotels, Theatres, Public Buildings, Offices and homes.

Air Conditioning and ventilation is taken to mean the application of equipment for cooling and heating.

Passing this air by a fuse or blower through the apparatus and distributing it to the space being dealt with by bringing the air into contact with cold or hot surfaces, coils of tubing with a cold water or brine circulation. Hot water or steam from a suitable boiler, Heat from the refrigerating plant is essential, or evaporated water or blast—stove or electric heater.

De-humidification or removal of moisture from the air is done with the cooling coils. In fact, the system is to take the edge off the extremes, 75° F.

The term "Air Conditioning" in its broadest meaning, is the artificial production of any predetermined set of atmospheric conditions. These conditions may be required for human comfort or may be required for some industrial process.

More specifically air conditioning is taken to mean the application of equipment for cooling and heating, for humidification and de-humidification and for purification of the air; all of these various functions being possible with the air conditioning plant, and controlled in accordance with the desired inside conditions and varying outside conditions.

While the control of atmospheric conditions may sound a difficult and somewhat mysterious art, it is, in reality, a very simple matter indeed, and calls only for the correct application of a number of standard pieces of equipment which are regularly manufactured and supplied by reliable manufacturers and agents.

To treat the air which is to be conditioned, it is necessary to have a means of passing this air through the apparatus and distributing it to the space being dealt with. A fan is therefore provided to circulate and distribute the air, receiving the untreated air, passing this through the remainder of the apparatus, where it is brought to the desired condition, and then distributing it as, and where desired, all by means of suitable duct working. The cooling and heating is done by bringing the air into contact with cold or hot surfaces, which usually consist of extended surface cooling connecting coils, kept at the desired temperature by passing a cooling or heating medium through the coils.

For further information, *see Advt. pp.* 9, 22.

WOOD STAVE PIPE

(Extract from above Company's Catalogue, 1926).

CONSTRUCTION.

" Pioneer " Machine Branded Wood Pipe is constructed of staves of selected oregon timber accurately dressed both sides with double " V " joints bound with No. 4 gal. mild steel wire and coated with asphaltum.

The Continuous Wood Stave Pipe is made of any dimensions from 10in. to 14ft. in diameter, and is always built " in situ," and the outside of the pipe is reinforced with steel rods, or bolted bands.

Electrolysis and the action of acids and mineral fumes have no effect on wood pipe. Resists frost better than any other type of pipe.

For further information, *refer Advt. p.* 15.

LIFE RECORDS OF DIFFERENT WOOD PIPES.

Wood pipe has for centuries past been used as a means of conveying water. The original water supply of London consisted of about 400 miles of wood pipe, some of which remained buried for over 250 years, and when excavated were found to be in an excellent state of preservation.

The City of Philadelphia, U.S.A., had in use 45½ miles of bored wood pipes, supplying water to 500,000 people. These pipes were laid in 1801, and were replaced in 1901 by larger mains. Although 100 years old, the pipes were found to be in prefect condition, and most of them were re-laid in factories, etc.

COST OF INSTALLING SYSTEM.

The proof of their 20 per cent. to 50 per cent. less cost, depending on diameter and pressure heads. Particulars copied from the company's catalogue.

Camden Water Supply.—The 4¾ miles of 8in. wood pipe was installed in 1909 at a cost of £2,900 complete. The same dia. in cast iron pipe would have been about £6,000 approx. cost. The estimated cost of duplicating with a 10in. wood stave pipe line, 9,300 yards in length, was £17,500, laid in trenches, as compared to the cost of 10in. cast iron pipe, £26,700. NOTE : The Board accepted the tender for the installation of 10in. Wood Stave Pipe line.

Narrabeen Water Supply.—4 miles of 6in. diameter, 250ft. head wood pipe laid in prepared trenches, estimated, £2,400 for wood, and weight, 100 tons. Weight : 300 tons, difference, 200 tons on 4 miles line. Estimated cost of 6in. cast iron pipe, £3,100. (1912 prices).

Based on Oregon at 18/–, Labourer's Wages, 1/–, Tradesman, 1/6. So according to increase of prices and recent 44 hour award for workmen, present prices of various diameters of pipe, different pressure heads, may be obtained from Lane Cove, N.S.W., or Footscray, Victoria, Factory Branches.

Comparative Prices W. & S. Board, N.S.W.—Average cost of 8in. Supply mains per mile : Cast iron, £1,583 ; steel, ⅛in. thick, £1,118 wood, £836. (1912).

Mount Cameron Water Race Board (Tas.), 3,000 ft. of 30in. wood stave pipe, laid in 1911 as a syphon, cost £1,602 ; laid in bearers in a shallow trench protected with earth covering throughout ; comparative tender price for the above work in steel, $\frac{1}{8}$in. thick, £3,000.

APPROXIMATE WEIGHT OF PIPES IN LBS. PER FOOT.

Inside Diameter In.	To Withstand Pressure 25ft. Lbs.	50ft. Lbs.	100ft. Lbs.	150ft. Lbs.	Head in Ft. 200ft. Lbs.
3	4½	4½	4½	4½	4¾
4	5	5	5	5½	5½
5	9	9	9½	9½	10
6	9½	9½	10	10½	11
8	12	12½	13	13½	13½
10	16	16	17	18	18½
12	17	17	17½	19	20
14	20	20	21	22	23
16	27	27	28	29	30
18	29	29	30	32	36
20	39	39	43	44	47
22	45	45	48	51	54
24	47	49	53	56	56

COMPARISON OF WEIGHTS.

Lbs. per foot.

	6in.	8in.	10in.	12in.
Wood Pipe, 50ft. press. hard	9½	12½	16	17
Cast iron pipe	32	45	65	77

WOOD MAIN CLAMPS.

4″ and 6″	¾″	12/6 ea.
4″ and 6″	1″	13/6 „
15″	¾″	13/6 „
15″	1″	14/6 „

ARTESIAN WELL BORING

By C. E. Mayes, Artesian Bore Contractor.

BORING FOR WATER.

The great success attending the results of artesian well-boring (both Government and private contracts) during the last 30 years throughout Australia, and the improved methods for boring, has reduced the problem of boring in numerous districts from a speculation to a comparative certainty.

The large expanse of the **Tertiary and Cretacious strata** or geological strata country of recent formation, is the water bearing strata.

Owing to the limited and uncertain rainfall, at least one-half of Australia must ultimately depend upon its water supply from artesian wells. The maps of Australia show that the N.W. portion of New South Wales, as well as the interior between the Lachlan and Darling Rivers, are destitute of rivers : this is also the case with the South West, West and interior of South Australia, and the interior of Western Australia, extending to the Great Australian Bight on the South Coast. The rainfalls of these vast flat areas do not find their way to the sea, but end in lakes, swamps, and underground streams, leading to immense basins with impervious beds, which only have to be tapped to bring the water to the surface. These beds are from 1000 to 4000 feet below the level of the sea. The back plain country being only 200 to 400 feet above sea level.

When the water does not rise quite to the surface, it is called **sub-artesian,** and requires the installing of deep well pumps. In many cases, salt water has to be passed through before fresh water is obtainable. This is shut off by enclosing the bore hole with steel tubes, or casing.

The more simple method of obtaining water, at shallow depth, are the following :—

TUBE WELLS.

Norton's Abyssinian Tube Wells.—The apparatus includes 28 feet of 1½ ins. gal. iron pipes, with perforations and a steel shoe at the bottom, and costs approx. in Sydney only £16, for 2in. pipes, £18 complete ; stronger and larger plants, £50 to £70. The pipe is supported by a wrought iron tripod stand, and driven by an iron monkey. In Christchurch, N.Z., tube wells are common.

Australian Water Auger is an earth auger, and is used in the same way as a carpenter's auger, with screwed iron rods for turning. The apparatus is simple and easily worked, and costs about £250 with tools, casing and appliances to sink 200 feet. Sinking under favourable circumstances will progress at the rate of 2 feet per hour for a 5in. auger.

Prospecting Boring in Small River Gravel, Shoalhaven Alluvial Flats.—Hand power auger, with portable shear legs, windlass, 3½in. shell and screw-augers, 1in. x 1in. square rods.

50 trial bores, 30 to 85ft. of river wash, shifting 80 yards to each bore. Labour only cost 1/– per foot. Plant cost £65.

Prospecting Boring in Felsite.—Burragorang, to 560 feet with a small cable-boring plant, for a 6in. diameter bore. Cost £1120 (including a second hand plant bought for £200) or £2 per foot in depth.

The last 2 systems were used and costs ascertained by the author in 1914, so reckon about **double** for present day requirements.

BORING AND PLANT REQUIREMENT.

Water Conservation and Irrigation, 1927.

By D. W. Price, Chief Inspector and Superintendent of Bores, N.S.W.

The two methods of drilling most commonly employed are known as the **Standard or Cable Tool Method,** and the **Hydraulic or Rotary Method.** Each of these systems is successful when used for drilling in ground to which it is adapted. In general, the cable tool method is preferred where the series of strata to be pierced is hard, and the severe impact of the walking beam motion is needed to churn the hole.

In soft and loose material, the **Rotary Method** is usually superior, and while it entails a greater expense for labor, fuel and maintenance of machinery, yet the speed it often attains and other advantages often warrant the added expense.

The Rotary Method has been in use but very little in Australia, principally through its cost and transport being prohibitive. But indications are at hand, when it is expected in the near future that such conditions suitable to our formations will be brought forward which will recommend the Rotary System more for general use.

The Standard or Cable Plant, with the necessary tools are made in this and other States. But Rotary Plant are so little understood that it is necessary to import them. The principal manufacturers for Rotary or any other plant are *The Lucy Manufacturing Corporation* and *Oil Well Supply Co., Ltd.,* America.

The approx. cost of a **Rotary Plant,** F.O.B. Sydney, £7,000. **Standard Plant,** F.O.B. Sydney, £3,000.

Good reliable **Shallow Boring Plants,** 500ft. capacity, £600.

These are Australian made, and I think preferable to those imported.

Casing used for boring at the present time is principally Stewart & Lloyd's Russian Brand, and Government specifications are.

Lighter Casing (seldom used), 4in. dia. x $\frac{3}{16}$in., 3/6 ; 4in. x $\frac{7}{32}$in. thick, 3/9 ; 5in x $\frac{3}{16}$in. thick, 4/- per ft. As the price fluctuates and our department indents our supplies, I am not sure of present prices. However, Stewart & Lloyd's would give you this.

The prices ruling depend greatly on the position of site, and of course, the competition. But a good average price would be 1500ft., £2 per ft. ; 2500ft., £2 10s. per ft. ; 3500ft., £3 per ft.

Under some conditions which are considered favourable, and competition more keen, prices are cut even on these figures.

Sub-artesian Boring is making great strides. No doubt nature has given this supply to a large extent to take the place of the **artesian bores,** which will without doubt give out in time, the yearly records prove this beyond doubt.

The most suitable shallow plant would be a 500ft. capacity. We have put holes down 1400ft. and providing no casing trouble occurs and care is observed, this particular plant will do this depth. However, for districts where wood and water is scarce, I would recommend an oil

engine instead of steam, the weight of plant with steam power, tools, etc., about 12 tons. With oil driven plant, 7 tons.

The casing used for shallow boring is principally 6in. x $\frac{3}{16}$in., being considered quite heavy enough. It also comes cheaper. Very often, 5in. casing is used. This is not considered advisable. Should any accident occur to mudwell pump, etc., the inside margin of casing is too small for necessary repairs.

The only manufacturers reliable, who understand boring tools are *John Overall & Sons, Balmain and Cockatoo Dock.* These do all our work, and I think the remainder of private, as this commission has 34 shallow plants, also two deep rotary and combination plants. The supplying of tools to us is a big item.

Sinkers.—In sinking, additional weight is given to the chisel bits by a sinker which is a cylinder of wrought iron screwed on to the bit. The sinkers are from $2\frac{3}{4}$ to 5ins. diam., and from 12 to 28 feet in length, in one or two parts.

Jars.—To prevent the jarring of tools, or when jammed to loosen them, a jar is used next to and above the sinker. It is about 5ft. long, with a sliding joint between ends, and both ends have connecting conical screws, and is an indispensable jar for all " percussions " drilling rigs.

As the boring or drilling proceeds, the casing is lowered to prevent the sides caving in or falling away.

ARTESIAN WELLS.

The sinking of these wells or bore holes for great depths by heavy machinery and steam power is generally commenced by boring with an auger an 11in. hole as deep as possible.

Into this bore is inserted 10in. wrought iron tube or casing, in lengths of from 4 to 18ft., with screwed ends. Inside this tube, holes are *jumped* by percussion for casings of 8, 6, and 5in. diam., as required. Each size of casing used is started from the surface, and continued as far as *possible.*

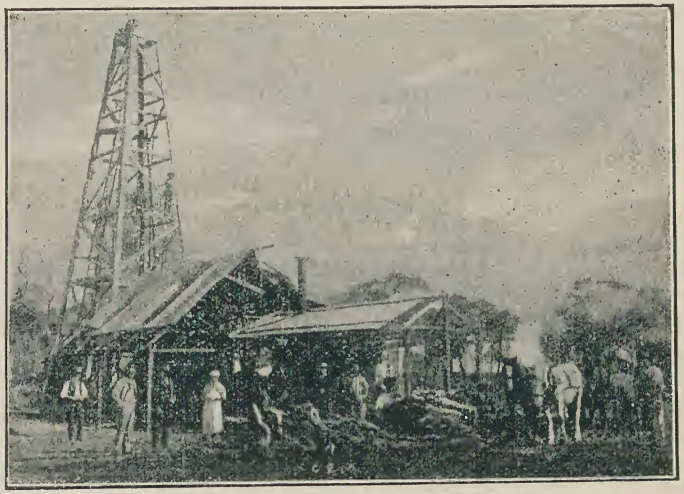
If the ground is very porous, the whole of the casing is sometimes left in the bore at completion.

In drilling, the rock, shale, &c., is reduced with water to the consistency of cream by heavy pulverising and cutting tools suspended on cable, after the manner pursued by quarrymen. The silt afterwards is removed by mud or sand pumps, whose outer diam. are at least $\frac{1}{2}$in. less than the bore of the casing, their lengths varying from 5 to 30ft. The lower ends of the sand-pumps have chisel shaped shoes of $\frac{5}{8}$ steel, screwed on to the tube or casing, with a valve to *open upwards,* the whole forming the **sand pump,** which by the aid of a $\frac{1}{2}$in. wire rope is lowered and raised in bore.

The Poppet Head or Derrick, is framed of Oregon pine, or wrought iron ; the size is 16ft. square at base by 56ft. high with the top 4ft. square ; it is in 7 stories of 8ft. each, resting upon hardwood sole plates or sleepers about 10in. x 8in., and erected over the proposed bore hole to support the gin wheels over which the wire ropes pass, connecting the spools or drums with the tools, &c.

Timber Required for Derrick.	Sup. Ft.
4 Standards, 56ft. x 9in. x 2in., and 56ft. x 7in. x 2in., the two forming an anglewood 9in. x 9in. in seven lengths to each standard, butt jointed and fished with Oregon fish plates...	600
28 Bearers, average 9ft. x 8in. x 2in.	336
28 Diagonals, average 13ft. x 6in. x 2in., only four diagonals to each bay, alternatively reversed	364
24 Joists, 6 x 2, laid flat for flooring, fish plates, &c.	308
4 Sleepers for flooring, 18ft. x 10in. x 8in., and top bearers of hardwood	592
	2200

Large beams, 18in. to 24in. diam., are used under floor each side of bore when hydraulic jacks are used to remove casing jambed, &c.



The Canadian or Pole System.—Wooden rods, 2¼ins. dia., spotted gum are connected by iron pole joints with cylindrical screws of Lowmoor iron, and centre straps riveted to the wooden rods (about 18ft. long). The boring string of tools, viz., bit, sinker and jar, weighing about 10 to 15 cwt., are attached to the rods, length by length, 38ft. at a time. Some of the deepest bores have been sunk with this system ; notably, four in the Moree district, N.S.W.—3765 feet at Tulloona, 3605 feet at Mooryalla, and 4086 feet at Dolgelly, were sunk by the author, C. E. Mayes, who is seen standing at centre, with D. W. Price, standing in grey, and writer of following latest article on Boring.

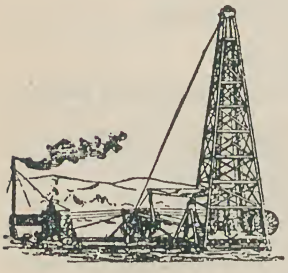
Weight of Plant, viz., engine, boiler, rig, derrick, camp equipment, tools, &c., about 15 to 36 tons and cost £1500 in 1890, a 2000 ft. rig will cost £2000.

Cartage to be added.

Cost for drilling **Artesian Wells** ranges from 17/6 to £3 per foot as the depth increases.

SYSTEMS OF BORING.

The Cable System.—Steel wire rope for its quickness in extracting and re-lowering tools recommends itself. A driller and an engine-driver, or "wrenchman," are required for each shift.



The large main spool for wire rope, called a "bull" wheel, and a smaller sand spool for sand line, worked by a *friction belt* or sand-spool, and a *rope bell* on pull wheels, are brought under the control of driller by levers and brakes.

The *walking beam* is the lever beam 10 to 25 feet long, used to give the up and down percussion movement to the cutting tools and can afterwards be used for pumping.

Risks, Accidents and Delays.—With the exception of mining, "Artesian Boring" is probably the most risky in the isolated districts of Australia.

The Risk from broken tools, or the telescoping of casing, or other unforeseen accidents is great, and must be allowed for in tendering.

Small Cable Drilling or Boring Plant, for shallow boring or sub-artesian, to 500 feet. Frame built of angle iron, except the derrick. Equipped for depths 250, 500, and 1000 ft. respectively. Weight 500ft. "Plant Rig," about 3 tons, 1000ft. "Plant Rig," about 3½ tons. Mounted on 3 or 4ft. iron wheels, for transport over rough bush roads. Cost about £750 according to equipment.

Both **Winding drums** for raising **tools** and **sand pump** are **friction geared,** no cog gearing being used. The derrick is detachable.

A 4 h.p. Nominal or Steam Gas Engine is required. Price, see following page.

For further information, see manufacturers, Overall, McCray Ltd., Artesian Well Specialists and Contractors, Sydney.

Hand Boring—Cost of Machines and Boring in Alluvial Soils.

				per ft.
No. 1.	Plant with two 8in. earth augers, horse, gear, &c., complete for a depth of 115ft. ...	£140		12/–
No. 2.	Ditto for a depth of 210 feet	160		14/–
No. 3.	do. 306 ,, ...	180		16/–
No. 4.	do. 400 ,, ...	200		20/–

Award Wages, 1923, Driller, from £6/10/– upwards; Laborer, £4/2/–. per week; with board, £2/17/–; Waggonette driver, award wage, 2/0¼ per hour.

Sub Artesian (or water that needs pumping).

Hand-boring.—Machines from Department of Mines for drilling small bore-holes through alluvian or soft rock to shallow depths are obtainable on terms.

" **Drysdale** " **Borehole Centrifugal Pumps,** for deep sub-artesian wells *Agents*: Wildridge, Sinclair Ltd., 97 Pitt St., Sydney.

BRASS ARTESIAN CYLINDER PUMPS.

With Gunmetal Caps.

From 1¾in. dia. to ¾in. dia., to insert in bore casing for lift pumps. *See advt., p.* 36.

When Water is reached by boring, it sometimes fails to rise to the surface. In such cases it is pumped up by deep well pumps, with brass tubes 4ft. 6in. long by 3½in. diam., having two brass valves for bottom and top, such a pump would cost about £25. As the pump rods are not liable to torsion, but only subjected to tension, ½in. galv. iron tubes are sufficient, having been used in one instance in Queensland for a depth of 1760 feet. When the water rises above the surface, it may be shut off by a valve, and supply regulated.

Leading drains are formed to direct the output of water when " struck " in boring. This is sometimes done by simply dragging the fork of a tree, the junction end first shaped pointed, or with a plow-share in front, the earth being forced out on both sides by the heavy trailing limbs following the flow of the water. This simple method often saves taking levels, and is much easier done while the earth is soft.

Drag Scrapers, 3½cub. ft., £4 5s. ; 5 cub. ft., £4 7s. 6d. ; 7 cub. ft., £4 10s.

Water for Engine, etc.—About 900 cubic inches of water is required per horse-power per hour = 3¼ gallons per hour x 24 = 78 gallons per day, and 78 x 10 = 780 gallons per day of 24 hours continuous drilling for a 10 horse-power engine.

For camping purposes, 100 gallons for waste and the use of the men in the camp, making in all 1100 gallons, or nearly five tons of water per day. As the engine is not always at work and seldom works up to its limit, the average would be about 800 gallons per day for a 10 h.p.

For larger boiler and engines, with camp allowance, up to 1500 gallons per day.

Reservoir.—When a drought is anticipated, a reservoir can be made at least 40ft. square at bottom, and 80ft. square at top by a depth of 10ft. at water level, this will hold 37,600 cubic feet of water, and will cost from £100 to £150 with the necessary waste weir. Portion of N.S.W., W. of the Paroo and Darling Rivers, and Queensland, is especially liable to drought, the annual fall of rain is only 10in. per annum ; so that condensers must be provided in any boring outfit to economise the water used as much as possible. The water hole should be alongside the water course, so that the bulk and rush of flood waters would not destroy it.

Fuel required.—About 10lbs. of good pit coal per horse-power per hour is required for a portable steam engine ; the relative steam pro-

ducing power of good hardwood as compared with good coal is about one-half, therefore 20lbs. of good hardwood per horse-power per hour would be required, and for a 10 horse-power engine 200lbs. per horse or 4800lbs. for a day of 24 hours.

Heavy work will take about 10 cords of hardwood per week.

TUBES FOR ARTESIAN BORES.

WEIGHT in lbs. per foot of WROUGHT STEEL CASING with swelled joints.

External Diameter	Thickness in fractions of an inch.									
	$\frac{5}{32}$	$\frac{3}{16}$	$\frac{7}{32}$	$\frac{1}{4}$	$\frac{9}{32}$	$\frac{5}{16}$	$\frac{11}{32}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$
4in.	6.3	7.5	8.7	9.9	—	—	—	—	—	—
5in.	—	9.6	11.1	12.6	14.1	15.5	16.9	18.4	—	—
6in.	—	11.5	13.4	15.2	17.0	18.8	20.6	22.3	—	—
8in.	—	—	—	20.5	22.9	25.4	27.8	30.2	35.0	—
10in.	—	—	—	25.8	28.9	32.0	35.1	38.1	44.2	50.2

WATERING TROUGHS.

(Sheep & Cattle).

No. 1 Pattern. Cattle. Galvanized. 20G. on 26″ Stands.
12ft. 18ft. 24ft. 30ft. 36ft.
62/6 84/6 106/6 128/6 150/6 ex.
for each 6 feet extra add 22/–.

No. 2 Pattern. Sheep. Galvanized. 16G. on 14″ Stands.
12ft. 18ft. 24ft. 30ft. 36ft.
57/6 79/– 100/– 121/6 143/–
for each 6 feet extra add 21/6.

CASING.

Stewart and Lloyd's Swelled Joint.

Outside Diameter. in.	Thickness of shell. in.	Weight per foot. lbs.	Compression Test tons.	Price per foot. approximate
5	$\frac{1}{32}$	11.12	48	4/6
6	$\frac{1}{4}$	16.22	65	6/–
8	$\frac{9}{32}$	23	80	8/6
10	$\frac{11}{32}$	35.2	100	15/10

The Southern Cross Sub Artesian Well drilling Plant to work holes to 500 ft. for road transport—£387. Approximate.

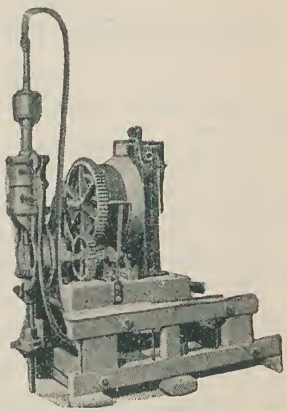
6 H.P. SX Deisel Engine	£124 10s.
German British Casing	5/——4/9 per foot.
Stewart and Lloyds	6/——5/8 „

DIAMOND AND MACHINE DRILLING.

DIAMOND CORE DRILLING.

Notes by James E. Elliott, of The Goldfields Diamond Drilling Co. Ltd., 1936.

Engineers and contractors have found the Diamond Drill of great value for preliminary testing for foundations for building bridges, barrages, or weirs, quarries, and for all kindred purposes where it is necessary to locate solid rock or to determine the depth at which the rock is sufficiently homogeneous to carry foundations or to enable tunnelling to be safely accomplished



Test drilling for the Metropolitan Water Supply Department, Sydney, in connection with their main tunnel project, North Sydney sewerage to ocean.

Bore holes have been used to assist in the drainage and ventilation of mines, and for rope-ways for haulage purposes.

The drill is capable of boring to 1 mile in depth vertical, 1200 feet in length horizontal, and 1500 ft. dipped at an angle of 45 deg. Holes may be drilled vertical up or down, and at any intermediate angle, from any point in the mine workings underground, or from surface and in any direction.

The standard diameter of core in coal borings is 2 inches, while in lode boring it is 1⅛ inch and at times 15/16 inch.

The " Clibostat " is an instrument used to show deviation of bore. A drill for 1000ft. weighs 18 cwt., and occupies a floor space of 3ft. 6in. x 6ft. 6in.

For underground boring no derrick is required, a recess in line of borehole, 14ft. is required to work the boring tools.

For **surface boring** to a depth of 2000ft. a tripod derrick is used. 32 feet high. For a greater depth a higher derrick is used, for the 20ft., rods.

The Department of Mines contracts for all classes of boring by diamond drill or will lease the drill out.

Persons to whom a drill is granted must supply at own cost the fuel and water required for the work ; pay a fee of two guineas (£2 2s.) to cover the cost of inspection of site ; pay at the rate per foot agreed upon with charges for exceptions ; also the Department is prepared to undertake the work on condition that the full cost of the work plus 12½ per cent. is paid to cover overhead and other charges, such as transport to and from the site of bore.

In sandstone boring with Diamond Drills 2in. bits from 15/– to 20/– per foot.

In primary rocks such as Granite Felsite, 30/– per foot according to length of boring.

The motive power may be steam combustion engines or electricity, and for underground boring, compressed air or elecrticity.

The amount of power for boring to 1000ft. is from 150 to 240 cubic feet of **free air** per minute, according to depth, or from 20 to 36 amperes at 220 volts if **electric power is used.**

Brazilian Carbon Diamonds, amorphous in structure and extremely hard, are used for boring hard rock.

The price of carbon during 1906 fluctuated between £15 and £25 per carat. A carat equals 3.17 troy grains.

The Australian Bort is unsuitable for boring hard rock, because of its crystalline and granular structure, which renders it susceptible to fracture. The South African Bort is too brittle to be of any use for boring, and Brazilian Ballas, being round and smooth, is deficient in the necessary cutting edges.

Holes vertically up, or at an angle above horizontal are restricted in length because the water head in the boring rods equals the pressure capacity of the flushing pump.

The cost of drilling these holes is about 2/6 per foot more.

In rocks of extreme hardness, such as granite, diorite, felsite, and quartzite, from 60 to 100ft. per week may be drilled, and in rocks of medium hardness, such as slates, schists, indurate sandstones and diabase, from 100 to 150ft. per week.

The progress decreases as depth is attained. Slow progress is often made in fast cutting rocks by reason of the frequent necessity to draw the cores which plug in the core barrel.

Rocks are more favourable to boring when intersected at right angles to the cleavage plans.

The amount of water required to flush the diamond bit depends upon the nature of the rock being drilled. If the water goes a maximum of 4000 gallons per day of 24 hours may be required ; or 300 gals. if tight strata.

The **cost of boring** ranges between 15/- and 35/- per lineal foot, according to the nature of the rocks to be intersected. Boring for quartz reefs or lodes is necessarily more expensive than boring in coal measures or basalt rocks by reason of slower progress and greater carbon expenditure.

COST OF PLANT.

Landed City Wharves—All States.

Diamond Prospecting Drill, capacity 300ft.—Approx. £300.

Diamond Drill, hydraulic feed, for steam or compressed air power vertical capacity 1000 feet, or horizontal, 800 ft.—Approx. £1000. according to equipment.

DIAMOND DRILL BORING.

Extract from N.S. Wales Mining Report.

Cost of Boring.

Sandstone and coal measures, 5/- to 10/-.

Bore at Broken Hill for minerals through quartzite, granite, diorite, gneiss, and mica slate, very hard strata, and destructive on diamonds. Total depth bored, 1122ft., days occupied, 133 ; rate per hour, 5.96 ins. ; cost per foot, 20/-. These costs are exclusive of officer's salaries, rent, &c.

Cost of diamonds used per foot in depth, average from 1/6 to 2/2.

LEGAL NOTES

RELATING TO BUILDERS AND CONTRACTORS AND ARCHITECTS.

TENDERS.

Tenders for Work or Goods.

A person who, by writing or by word of mouth, invites tenders for work to be done, or offers of or for goods for purchase or sale, does not by such invitation impliedly promise to accept any tender or offer, the invitation or notice to the effect that " tenders will be received," being no more than an announcement (unless it is expressly stated otherwise) that he is willing to receive tenders or offers (*Spencer* v. *Harding*, 5 L.R.C.P. 561).

But an unconditional tender to undertake work, or to supply goods, on specified terms, and the acceptance of such by the person to whom it is made, will be sufficient to constitute a binding contract ; and an intimation in the acceptance of such tender, that a " contract will be prepared," merely means that a formal contract is to be drawn up (*Lewis* v. *Brass*, 3 L.R.Q.B.D. 667). If, however, the terms of the tender or acceptance imply that the proposed agreement is to be *subject* to the preparation and approval of a formal contract, there will be no binding agreement until the formal contract is completed (*Winn* v. *Bull*, 7 L.R. Ch. D. 29).

When Contracts should be in Writing.

A contract to build, alter, or repair a house, or any other construction, and to provide materials for the purpose, need not be in writing, unless it is *not to be performed within a year* ; a contract to build, alter, or repair a house, etc., not being in law a contract for the sale of goods, even as regards the materials, but being an entire contract for work and materiaals.

But as regards building or other contracts which are not to be performed within a year—that is, contracts the complete performance of which will necessarily extend over more than a year, or the performance of which is intended by the parties to extend over more than a year—by the Statute of Frauds (29 Ch. II. c. 3, s. 4) " no action shall be brought . . . upon any agreement that is not to be performed within the space of one year from the making thereof, unless the agreement upon which such action shall be brought, or some memorandum or note thereof, shall be in writing and signed by the party to be charged therewith, or some other person thereunto by him lawfully authorised."

It is not necessary in every case that there should be a formal contract drawn up with technical precision or legal formalities. Any memorandum under the hand of the " party to be charged," which was made before action brought, and which names the contracting parties, or so describes them as to identify them, and which contains, either expressly or by references to other written papers the terms of the agreement, will be sufficient to satisfy the Statute of Frauds, although it be merely a recognition or adoption of a prior written statement

of such terms not signed by the party. But a memorandum expressing a *mere purpose* or *intention* is not sufficient to satisfy the Statute. Again, where a contract or note in writing exists which binds one party any *subsequent* note in writing, signed by the other, will be sufficient to bind him, provided it either contains in itself the terms of the contract, or refers to any writing which does contain them.

Building contracts entered into with a corporate body, to be binding upon the corporation, should be made under seal (*Hunt* v. *Wimbledon Local Board*, 4 L.R.C.P.D. 48; *Young* v. *Mayor of Leamington*, 8 L.R.Q.B.D. 579). But trading corporations can contract without seal for matters essential to the purpose for which they are formed (*South of Ireland Colliery Company* v. *Waddle*, 38 L.J.C.P. C38).

Contracts for Sale of Goods.

By the Sale of Goods Act, 1923, a contract for the sale of any goods *of the value of* £10 *or upwards* shall not be enforceable by action unless (i.) the buyer shall accept part of the goods so sold, and actually receive the same; or (ii.) give something in earnest to bind the contract, or in part payment; or (iii.) unless some note of memorandum in writing of the contract be made and signed by the party to be charged or his agent in that behalf; and these provisions are to apply to every such contract, notwithstanding that the goods may be intended to be delivered at some future time, or may not at the time of such contract be ready for delivery.

There is an "acceptance" of goods within the meaning of the Act when the buyer does any act in relation to the goods which recognises a pre-existing contract of sale.

Contracts with Building Committees.

Where a building contract is entered into with the trustees of a building fund, as of a church, chapel, or school, the contract may be so framed as to limit the liability of the trustees to the period during which they remain trustees, as well as to exempt such trustees from all personal liability, binding them only to the extent of the building fund (*Williams* v. *Hathaway*, 6 L.R.C.D. 544).

Death of Employer before Building Contract completed.

It is a presumption of law that the parties to a contract bind not only themselves, but their personal representatives, except in the case of contracts involving the exercise of individual skill personal, such as a contract to paint a picture. And so, in the case of a building contract, where the employer dies before the contract is completed, his executors or administrators are bound not only to pay such sums as may be due for work already done under contract, but to carry out the deceased employer's obligations so far as they remain unfulfilled under the contract; and, on the other hand, the executors or administrators of such deceased employer will be in a position to bring an action against the builder if he fail to carry out his part of the contract (*Wentworth* v. *Cook*, 10 Adolphus & Ellis 42; *Cooper* v. *Jarman*, 3 L.R. Eq. 98.)

Contracts of Hiring.

It is sometimes advisable that contracts of hiring and service should be in writing, in view of the provision made by s. 4 of the Statute of Frauds as to " agreements not to be performed within the space of one year from the making thereof."

It should also be remembered that where no time is limited, either expressly *or by implication*, for the duration of a contract of hiring and service, the hiring is considered, in law, a hiring for a year. And this rule applies to all contracts of hiring and service, whether written or verbal, whether express of implied, and whatever the nature of the service (*R.* v. *Worfield*, 5 T.R. 506 ; *Emmens* v. *Elderton*, 13 C.B. 495). But it does not apply where the contract contains stipulations inconsistent with the application of it (*Baxter* v. *Nurse*, 6 M. & G. 935). Nor does the rule apply where there has been a service, but no contract of hiring, and no circumstances from which a contract can be implied (*Beeston* v. *Collyer*, 4 Bing. 313).

If the agreement is to do work by the job, if cannot be considered a yearly hiring, although the job last more than a year (*R.* v. *Woodhurst*, B. & Ad. 325). But if the hiring be for a year, a mere stipulation for payment by piece-work will not render it the less a yearly hiring (*King's Norton* v. *Cambden*, 2 Str. 1139). In a case where the hiring was at 3s. per week " all the year round," with liberty to leave on a fortnight's notice, this was held to be a yearly hiring (*R.* v. *Birdbrooker*, 4 T.R. 245).

Where the *only circumstance* from which the intended duration of a contract of hiring and service can be inferred is the *reservation of wages weekly* it must be taken to be a weekly hiring. But if there be anything in the contract of hiring to show that it was intended to be for a year, the reservation of weekly wages will not control it.

All contracts of hiring and service are put an end to by the death of the master, and therefore the executors or administrators of the master cannot bring an action to enforce a contract of service after his death.

An indenture of apprenticeship is dissolved by the death of either master or apprentice (*R.* v. *Peck*, 1 Salk. 68). But where the apprentice is bound for two masters, on the death of one he becomes the apprentice of the survivor (*R.* v. *St. Martin*, 1 Harr. & W. 69).

Building and Leasing Agreements.

Where an owner of land agrees with a builder that, upon the erection of houses upon such lands in conformity with the terms and conditions of the agreement, the owner will grant to the builder leases of separate plots of such land, such an agreement is a separable contract ; and the builder (or assignee of such agreement) will be entitled to have leases of particular plots granted to him upon his performance of the agreement so far as those plots are concerned, although he may be unable to carry out the agreement in its entirety (*Williamson* v. *Clements* 8 L.R. Ch. 96).

It has been held by the Court of Appeal that a building containing several residential flats constitutes only one house within the meaning of the word " house " in a covenant not to erect more than a certain

number of houses, unless there is some context which cuts down or alters the popular interpretation of the word (*Kimber* v. *Admans*, C.A. [1900] 1 Ch. 412).

Architect's Certificates.

Where an architect's certificate that work has been done in a satisfactory manner is a condition precedent to payment under a building contract, a letter from the architect inclosing the builder's account, or a mere checking of the account by the architect, is not sufficient; but the architect's certificate must be in terms showing that the work has actually been done (*Morgan* v. *Binnie*, 9 Bingham 672).

But when an architect has fraudulently and in collusion with the employer, withheld a certificate that the builder has satisfactorily executed the work he had undertaken, the builder, if the contract was made with him by the architect as the agent for the employer, can sue the architect for damages (*Ladbrook* v. *Barrett*, 46 L.J.C.P.D. 798; and see *Milner* v. *Nield*, 5 Ex. 829). And where the contract is made direct with the employer, and not through the architect, the builder under similar circumstances may proceed against the architect (*Stevenson* v. *Watson*, 48 L.J.C.P. 318).

Where an architect has acted "improperly and unfairly in the exercise of the powers conferred on him by the contract," so that the builder is a loser through his misconduct, the builder will be entitled to recover from the employer the full amount to which he is entitled under the contract (*Pawley* v. *Turnbull*, 3 Gifford 70).

But an action will not lie against an architect for carelessly and negligently performing the work required to give a certificate, unless fraud be also established, the duties of the architect in relation to granting a certificate being not ministerial but judicial (*Stevenson* v. *Watson*, 48 L.J.C.P. 318).

Where a building contract provided that the decision of the architect as to the execution of works should be final and without appeal, and the building-owner refused to pay a portion of the architect's fees, on the ground of alleged negligence by the architect in not deducting from the builder's account a sufficient amount for work not actually done, it was held by the Court of Appeal that, although the architect's certificate was final as between the builder-owner and the builder, the building-owner was not bound by it as between him, self and the architect (*In re Rogers*, architect; see *Architect*, Nov. 20-1891).

Charges of Quantity Surveyor.

It was decided in 1892 that the "reasonable usage" of the building trade is that the builder whose tender is accepted is liable to the quantity surveyor for the amount due for taking quantities; but if no tender be accepted, the building owner or architect is liable (*North* v. *Bassett*, 1 Q.B. 333).

Extras.

Where a claim is made for extras, it must be shown from the original contract what was intended to be included therein, so that what will constitute extras may be ascertained (*Buxton* v. *Cornish*, 12 M. & W., 426).

In a case where a builder had contributed to build and complete a house according to a specification, and the specification, while mentioning the scantling of joists for the floors, rafters, and ridge and wall plates, made no mention of the flooring, it was held that the builder could not charge the flooring as an extra ; the agreement and specification, taken together, making it clear that the builder could not have reasonably supposed the flooring would be an extra (*Williams* v. *Fitzmaurice*, 3 H. & N. 844).

Where it is stipulated in a building contract, that additions made under " an order in writing " shall be paid for, the builder cannot claim payment for extras which may be done without such order, even though done at the verbal request of the employer (*Russell* v. *Bandeira*, 13 C.B.N.S. 149 ; *Westwood* v. *Secretary of State for India*, 7 L.T.N.S. 736 ; *Franklin* v. *Parke*, 6 L.T.N.S. 291). And even though payments in advance have been made on the architect's certificates after variations have been made, these will not obviate the necessity of showing that " orders in writing " directing the variations were given as required by the contract, to enable the builder to make a valid claim for payment for such variations (*Tharsis Sulphur and Copper Company* v. *McElroy*, 3 L.R. App. Cas. 1040).

Mere sketches of extra work, drawn by the architect, and by him handed to the builder, are not in themselves a sufficient compliance with a requirement that extras are to be done under an order " in writing " (*Myers* v. *Sarl*, 30 L.J.Q.B. 9).

But where it was stipulated in a building contract that no extras should be allowed without a written order, and that in case of dispute the architect's decision was to be final, and the architect at the end of the contract made a certificate allowing extra work for which no written order had been given ; it was held that neither employer nor builder could raise the question whether a sufficient order had been given, unless the conduct of the architect in making the certificate had been fraudulent (*Goodyear* v. *Mayor of Waymouth*, 35 L.J.C.P. 12).

FIXTURES.

" Tenant's fixtures " are personal chattels annexed to the freehold by the tenant during his occupancy, either for mere ornament and convenience or for the purpose of his trade, and which he has a right to sever during such occupancy in the absence of any express stipulation or local custom to the contrary.

" Landlord's fixtures " are those put up by the landlord before or during the term of the tenant's occupancy, or by any previous owner or tenant or by any other person ; also such fixtures put up by the tenant during the term as the tenant has no right to remove. All these constitute part of the freehold, and also part of the premises demised. In a more confined sense, " landlord's fixtures " are the fixtures which are on the premises at the time of letting to the tenant and are demised therewith, and which are usually specified in a schedule to the lease or agreement ; and to these may be added erections and fixtures subsequently added by the tenant, which he is not entitled to remove during his occupancy.

Amongst articles put up for ornament or for convenience of a tenant which have been held to be removable as *tenant's fixtures*, are : hangings, tapestry, and pier-glasses, whether nailed to the walls of panels or put up in lieu of panels ; cornices ; marble and other ornamental chimney-pieces ; marble slabs ; window-blinds ; wainscot when *screwed* to the walls ; grates, stoves, and ranges, although fixed in brickwork ; iron backs to chimneys ; beds fastened to the walls or ceilings ; fixed tables ; furnaces and coppers ; pumps ; wash-tubs ; fixed water-tubs ; coffee and malt mills ; cupboards fixed with holdfasts ; bookcases standing on brackets and screwed to the walls, clock-cases ; iron ovens. But such fixtures can only be removed if the removal can be effected without material damage to the freehold.

A wider rule prevails at law with respect to trade fixtures than to fixtures for mere ornament or convenience of an occupier. Thus, a nurseryman is allowed to remove his greenhouses, but a private individual is not (*Wyndham* v. *Way*, 4 Taunton, 316). But greenhouses built in a garden, and constructed of wooden frames fixed with mortar to foundation walls of brickwork, cannot be removed by the occupier who built them ; nor may a boiler built into the masonry of the greenhouse be removed by the tenant ; but the pipes of a heating apparatus which is connected with the boiler by screws may be removed by him (*Jenkins* v. *Gething*, 2 Hemming and Johnson 520).

Among appliances which have been held to be *trade fixtures removable by a tenant* (in the absence of express stipulations to the contrary in the lease) are : furnaces, vats, coppers ; dyeing and brewing vessels, and pipes belonging thereto ; steam-engines, and chimneys belonging thereto ; baking ovens ; cider-mills ; salt-pans. Machinery, engines, plant, and utensils used in trade, however bulky or complex, may be taken to pieces and removed ; also a temporary shed erected for the purpose of protecting a steam-engine of machinery, or for other temporary purpose ; but if the building stand on stone or brick foundations let into the soil, and is so constructed as not to be removable without the entire destruction of the fabric, it cannot be disannexed from the freehold and taken away.

A tenant should always remove his fixtures prior to the determination of his tenancy, for after he has quitted the premises he cannot re-enter for the purpose of severing and removing his fixtures without express permission (*Lyde* v. *Russell*, 1 B. & A. 394 ; *Minshall* v. *Lloyd*, 2 M. & W. 450).

And in whatever mode a lease or other tenancy be determined, the tenant has no right (unless protected by special contract) to remove his fixtures after he has ceased to be in lawful possession. Thus, where a tenant had forfeited his lease by an act of bankruptcy, and the landlord re-entered, it was held that the landlord was absolutely entitled to all fixtures remaining upon the premises at the date of the re-entry (*Pugh* v. *Arton*, 38 L.J. Ch. 619).

WORKERS' COMPENSATION ACT, 1926.

The right of a worker to recover compensation from his employer for injuries or disease contracted in the course of his employment is

now governed in New South Wales by the Workers' Compensation Act, 1926.

Section 7 (1 and 2) of the Act states :—

" (1) A worker who receives personal injury—

(a) in the course of his employment, whether at or away from his place of employment ; or

(b) without his own default or wilful act, on the daily or other periodic journey between his place of abode and his place of employment.

(and in the case of the death of the worker, his dependants) shall receive compensation from his employer in accordance with this Act.

Compensation shall not be payable in respect of any injury received during any substantial interruption of, or deviation from the journey referred to in paragraph (b) of this sub-section, if the interruption or deviation is for a reason unconnected with the worker's employment.

(2) Compensation shall be payable in respect of any injury resulting in the death or serious and permanent disablement of a worker, notwithstanding that the worker was, at the time when the injury was received, in a place not directly concerned with his employment, but forming part of the employer's premises, or acting in contravention of any statutory or other regulation applicable to his employment, or of any orders given by or on behalf of his employer, or that he was acting without instructions from his employer, if such act was done by the worker for the purposes of and in connection with his employer's trade or business."

and the succeeding sections set out the methods of computation on which compensation by way of weekly payments is to be made. It should be noted however that the Act provides that at the option of the worker the employer may be ordered to pay a lump sum ranging from £75 to £675 according to the injury received.

The pivot on which the Act works is in Part III. which provides for compulsory insurance by each employer with an insurer specially licensed under the Act, unless the employer has obtained permission from the Workers' Compensation Commission to undertake his own liability.

The administration of the Act is placed in the hands of a Workers' Compensation Commission consisting of a chairman and two other members, whose decision shall be final except where it chooses to state a case on a question of law to the Supreme Court for decision.

The following subsections of section 6 of the Act should be particularly noted with reference to the positions of a contractor under the Act :—

" 1. (*inter alia*). In this Act, unless the context or subject matter otherwise indicates or requires :

' *Employer* ' includes any body of persons, corporate or unincorporate, and the legal personal representative of a deceased employer. Where the services of a worker are temporarily lent or let on hire to another person by the person with whom the worker has entered into a contract of service

or apprenticeship the latter shall, for the purposes of this Act, be deemed to continue to be the employer of the worker whilst he is working for that other person. Employer also includes any Government department heretofore or hereafter created, or any Minister, trust, commission, or board, exercising executive or administrative functions on behalf of the Government of the State as for example, the Railway Commissioners for New South Wales, the Sydney Harbour Trust, the Metropolitan Water, Sewerage and Drainage Board, the Water Conservation and Irrigation Commission, the Board of Fire Commissioners of New South Wales, the Metropolitan Meat Industry Board, or the Hunter District Board of Water Supply and Sewerage.

'*Worker*' means any person who has entered into or works under a contract of service or apprenticeship with an employer, whether by way of manual labour, clerical work, or otherwise, and whether the contract is expressed or implied, is oral or in writing, but does not include :—

(a) any person employed otherwise than by way of manual labour whose remuneration exceeds seven hundred and fifty pounds per year ; or

(b) an outworker ; or

(c) a member of the police force ; or

(d) a person whose employment is casual and who is employed otherwise than for the purposes of the employer's trade or business."

" 3. (a) Where any person (in this subsection referred to as the principal) in the course of or for the purposes of his trade or business contracts with any other person (in this section referred to as the contractor) for the execution by or under the contractor of the whole or any part of any work undertaken by the principal, the principal shall be liable to pay to any worker employed in the execution of the work any compensation under this Act which he would have been liable to pay if that worker had been immediately employed by him ; and where compensation is claimed from or proceedings are taken against the principal, then, in the application of this Act, reference to the principal shall be substituted for reference to the employer, except that the amount of compensation shall be calculated with reference to the earnings of the worker under the employer by whom he is immediately employed : Provided that, where the contract relates to threshing, ploughing, or other agricultural work, and the contractor provides and uses machinery driven by mechanical power for the purposes of such work, he and he alone shall be liable under this Act to pay compensation to any worker employed by him on such work.

(b) Where the principal is liable to pay compensation under this subsection, he shall be entitled to be indemnified by any person who would have been liable to pay compensation to the worker independently of this subsection and all questions as to the right to and amount of any such indemnity shall in default of agreement be settled by the Commission under this Act.

(c) Nothing in this subsection shall be construed as preventing a worker recovering compensation under this Act from the contractor instead of the principal.

(d) This subsection shall not apply in any case where the injury occurred elsewhere than on, or in, or about premises on which the principal has undertaken to execute the work or which otherwise are under the control or management: Provided that nothing in this paragraph shall affect the liability of the contractor under any other provisions of this Act."

" 5. (a) Where any person (in this paragraph referred to as 'the principal') in the course of or for the purposes of his trade or business enters into a contract with any other person or persons (in this paragraph referred to as 'the contractor') under which the contractor agrees :—

(i) to supply timber and such timber is obtained or to be obtained from trees felled or to be felled by the contractor of his wages-men (whether such trees are the property of the principal of the contractor or any other person) ; or

(ii) to fell or ringbark trees or cut scrub or haul or load timber or haul and load timber ; or

(iii) to clear land of stumps of logs ; or

(iv) to cut sugar-cane ; or

(v) to perform any other work or class of work specified by proclamation of the Governor and published in the Gazette ;

and the contractor does not either sublet the contract or employ workers, or, though employing workers, actually performs any part of the work himself, the contractor and any worker so employed shall, for the purposes of this Act, be deemed to be workers employed by the principal.

(b) Where any person (in this paragraph referred to as the principal) advertises or otherwise notifies that he will accept timber delivered or supplied to him or his agent or other person in accordance with such advertisement or notification, or advertises or otherwise notifies to the above mentioned effect, any person who gives notice to such principal that he will deliver or supply such timber or any part thereof, and receives injury while engaged in or about the work, of cutting delivering, or supplying the said timber or any part thereof shall be deemed to be a worker employed by the principal.

Notice of intention to deliver or supply timber as aforesaid shall indicate the nature of the actual work to be undertaken and the time within which it will be performed. The notice shall be given prior to injury and may be given personally or by letter posted to the principal at his place of business or ususal address.

'Timber' includes sleepers, piles, poles, girders, logs, or pit timber.

'Cutting' includes felling, sawing, obtaining, preparing, or doing any work in connection with timber, and 'cut' has a corresponding meaning."

Among the many general and miscellaneous provisions in the Act employers should note their obligation to keep posted in a conspicuous position in the place of employment a summary of the requirements of the Act with regard to the giving of notice of injuries and the making of claims by workers.

Payment of Smaller Sum "in settlement" of Debt.

It is well established (though commonly overlooked by business men) that a *mere cash payment* in lieu of a larger sum actually owing, though accepted in satisfaction by the creditor, does not in law discharge the debtor, there being in such case no "consideration" for the creditor's promise not to ask for the balance, and hence no contract enforceable at law (Co. Litt. 212b); *Cumber* v. *Wane*, 1 Str. 426; *Foakes* v. *Beer*, H.L. 9 App. Cases 605).

But it is otherwise if the larger sum claimed be *in dispute*, and the smaller sum is accepted in consideration of the settlement of the dispute as to the amount of the debtor's liability, thus avoiding legal proceedings; or if the settlement (as commonly done with a body of creditors) is *by deed*, which of itself imports a consideration. And an offer by the creditor to "take a cheque" (or other negotiable instrument) for the smaller sum, in settlement of his claim, also imports a new consideration, the debtor's only obligation being to pay in cash; and such offer, if acted on by the debtor, operates to make a legal contract discharging the debt (*Solree* v. *Tripp* [1846] 15 M. & W. 23).

After six years any claim for the balance, if it has not been enforced by the creditor, will be barred by the Statute of Limitations. But the effect of the statute may be avoided by a subsequent acknowledgment of the debt.

Proffer of Cheque "in settlement."

When a cheque is sent by a debtor with an intimation that it is sent "in settlement" of a claim, it is a mistake to suppose that the creditor must return the cheque if he maintains that a larger amount is due to him. In two cases that went to the Court of Appeal, the defendant in each case had sent to the plaintiff a cheque for a smaller amount than was claimed, stating that it was intended to be "in settlement." The plaintiffs, however, both replied that they accepted the cheques "on account"; and in each case it was held that the plaintiff was not precluded from suing for the balance of his claim (*Miller* v. *Davies*, 59 L.J.R.Q.B. 293; *Day* v. *M'Lea*, L.R. 22 Q.B.D. 610, 612).

If, after a proper tender of an amount "in settlement," and the refusal by the creditor to accept such amount on account, the creditor should sue the debtor for the full amount claimed by him, he will (if successful) "recover" in the action only the amount on which he and the debtor have been at issue, and will be entitled to no more costs than are allowable on an action for the disputed amount (*James* v. *Vane*, 2 E. & E. 883; 29 L.J.Q.B. 169).

Payment of Wages—Truck Act.

By the Truck Act of 1900 it is required that wages of workmen be paid in money, it being made illegal by the Acts to pay wages in goods, or to make any agreement to set off as wages the price of articles supplied; or for the employer to impose any condition, express or implied, as to the person, time, or place with whom, or when, or where, a workman's wages or any portion thereof are to be expended. No deduction may be made from a workman's wages for sharpening or repairing tools, except by agreement not forming part of the conditions of hiring; and when part of a workman's wages is—by agreement, custom, or otherwise—payable in advance, the employer is expressly forbidden by the Act to make any deduction for interest or poundage.

A deduction from the wages of a workman for a subscription to a sick club is illegal under the Truck Acts, but in a case where a workwoman had acquiesced in the payment out of her wages of such a subscription, the Court of Appeal held (1892) that she was debarred from recovering back the amounts so paid the fund to which they were paid not being an unlawful one (*Hewlett* v. *Allen*, Weekly Notes, 139; see also *Ex parte Cooper*, 26 Ch. D. 693).

By the Liquor Act 1898 the payment of wages in any public-house is prohibited, except by the resident owner or occupier of a public-house, beershop, &c., to workmen *bona-fide* employed by him.

Any employer infringing the Truck Act renders himself liable for a first offence to a penalty not exceeding £10; for a second offence, not exceeding £25; and for a third offence the offender may be fined any sum not exceeding £50. Penalties are recoverable before two justices.

Commonwealth Industrial Arbitration Act, 1912, amended 1918 states: "That any person who enters into a contract with a contractor for the carrying out of any work involving the payment of wages shall be liable for the payment of such wages unless upon final payment made by him to the contractor in relation to the contract, he receives a statement in writing signed by the contractor that no wages are due and owing by the contractor in respect of the work at the time of such payment. Any person who knowingly makes or signs a false statement that no wages are due or owing by him in respect of any work shall be liable to a penalty of £100 or up to six months' imprisonment."

INSURANCE

Insurance against various contingencies is an essential part of the costing for all classes of Builder's estimates. Adequate allowance should be made for the various classes of insurance available, even if not embodied in the specifications. No builder can afford, as an individual, to take risks against which he can protect himself by insurance. There is always the danger of incurring heavy legal expense to defend doubtful claims and even minor mishaps involve considerable expenses and time in interviewing witnesses, obtaining legal advice, etc.

Workers' Compensation Insurance.

This is the most important insurance cost a builder has to allow for. Insurance is compulsory with heavy penalties for non-compliance. Cover for liability under Workers' Compensation Acts should be definitely secured before commencing any work whatsoever. Liabilities vary in different States and Commonwealth Territories, but under the New South Wales Workers' Compensation Act, 1926-1929, weekly compensation is payable up to two-thirds of the average weekly wages with allowances for wife and children, with a limit of £1,000. Substantial amounts are specified for various permanent injuries with amounts up to £800 for fatal accidents. Cover for liability to direct employees at Common Law up to £1,000, including law costs and expenses can also be included in the Workers' Compensation Policy without extra charge. The premium payable for these indemnities is based on estimated wages for a particular job or over a certain period. Estimates should be reasonably accurate and are adjusted on completion of the job or expiration of the period covered. The amount of wages actually expended must be supplied to the Insurers and the premium adjusted thereon by payment of an extra amount or refund as the case may require. A fair original estimate will obviate a perhaps unexpectedly heavy charge on adjustment. Insurers have the right to inspect all wages books, pay sheets and records, with recourse to the Workers' Compensation Commission if necessary.

Sub-Contractors.

The New South Wales Workers' Compensation Act, 1926-1929, makes a principal directly responsible to the Sub-Contractor's employee. The latter need not claim upon his actual employer, but may apply direct to the principal, who has the right to be indemnified by the Sub-Contractor: should the last-named be a man of "straw" the right may prove illusory. It is therefore incumbent upon the principal contractor to make sure that his sub-contractors have their men properly insured; mere enquiry is not always sufficient. In case of doubt inclusion in the principal's own policy can be arranged on the basis of 50% of the contract price for "labour and material" contract, and 90% of a "labour" only contract.

Brick-layers as sub-contractors present a considerable danger to the builder. It is doubtful whether brick-laying by piecework really constitutes a contract owing to the operation of the Bricklayers' Award, and it is probable that it would not be recognised as such by the Workers' Compensation Commission, in which case the builder would be liable for the "boss" bricklayer as well as the latter's employees.

Public Risk.

This is a class of insurance the necessity for which has become definitely evident to the prudent builder. The general public is growing more and more " claim conscious " ; even where there may be no evidence of negligence there is the danger of an action on the off-chance of securing a verdict. Successful defence does not always enable recovery of costs. The liability of a contractor on any ordinary building job is extensive ; he may become liable to a member of the general public for damages for any accident due to the negligence of himself or employees or through any defect in his works, ways, machinery or plant. Every caller is a possible claimant. Whilst trespassers and persons present from idle curiosity have very limited rights of action, all callers who come to the premises for purposes of work or business in which the occupier has an interest and upon his invitation, expressed or implied, have very definite rights. As regards such persons it is the duty of the occupier to guard them against unusual danger ; bricks and materials stacked on footpaths constitute a considerable hazard.

Sub-Contractors and their employees come within the range of a builder's liability at Common Law; the Sub-Contractor himself has the same rights as an outside member of the public. Despite the fact that his employees may be covered under a Workers' Compensation Act, they have a right of action for negligence on the part of the principal contractor or his direct employees and any Workers' Compensation payments would be recoverable by the Company making them. The Public Risk Policy can be extended to cover all such eventualities for a comparatively small extra premium.

Fire Insurance.

Buildings in course of erection should always be insured against the risks of fire, when the roof timbers are fixed. This is nearly always provided for in the specifications, but as the premium involved is so very small, cover should really be effected as soon as any timber is placed on the site of the job. A Fire Policy covering a building in course of erection extends to cover materials on the ground thereof, so that all timber, window and door frames etc., and even materials for the building stored in the builder's shed on the site, would be included in the insurance. Hence it is unwise to wait until the building is well advanced before taking cover.

Another feature is that frequently an actual policy has to be produced before a " draw " can be made for work done : a last-minute rush to secure a policy may mean quite a delay at an inconvenient moment.

Plate Glass Insurance.

Plate glass may be insured against accidental breakage. There is always the danger of an employee accidentally bumping it with materials or plant or inadvertently knocking it whilst working in the vicinity. Insurance can be effected for any period that may be required to cover this special builder's risk.

Motor Vehicle Insurance.

Comprehensive Insurance covering damage to Motor Vehicles by fire, accident or theft can be effected at reasonable rates. This includes liability at Common Law to an unlimited amount for damages which may arise in the event of an accident causing accidental bodily injury to some member of the public, or damage to another car or property belonging to the public.

Should the full cover not be desired, Third Party Insurance only to cover liability at Common Law should certainly be effected.

Personal Accident Insurance.

The most important man of the job is often not protected by insurance. The builder can secure similar protection to that provided for his workmen by effecting a Personal Accident Policy. This will afford him weekly payments for temporary total disablement by accident and capital sums for various permanent incapacities.

Full particulars regarding cover and rates for the various classes of insurance mentioned above may be secured from THE MASTER BUILDERS' INSURANCE COMPANY LIMITED, 16-20 BRIDGE STREET, SYDNEY—TELEPHONE B 5228.

TABLE OF THE NUMBER OF DAYS

From any day of one month to the same day of any other month in the same year.

From any day of	To the same day of											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Jan.	365	31	59	90	120	151	181	212	243	273	304	334
Feb.	334	365	28	59	89	120	150	181	212	242	273	303
Mar.	306	337	365	31	61	92	122	153	184	214	245	275
Apr.	275	306	334	365	30	61	91	122	153	183	214	244
May	245	276	304	335	365	31	61	92	123	153	184	214
June	214	245	273	304	334	365	30	61	92	122	153	183
July	184	215	243	274	304	335	365	31	62	92	123	153
Aug.	153	184	212	243	273	304	334	365	31	61	92	122
Sept.	122	153	181	212	242	273	303	334	365	30	61	91
Oct.	92	123	151	182	212	243	273	304	335	365	31	61
Nov.	61	92	120	151	181	212	242	273	304	334	365	30
Dec.	31	62	90	121	151	182	212	243	274	304	335	365

Example.—To find the number of days from April 4th to November 4th look for April in the left hand vertical column, and November at the top, and where the lines intersect is 214—the number sought.

Again, to find the number of days from June 10th to September 16th, the number between **June 10th to September 10th** is 92; add 6 days for the excess of 16 over 10th September and 98 days are realised as the number required.

If 29th February occur in the computation add one to the number of days.

When the time exceeds **one year** add 365 for each year; 366 for each leap year.

TIMBERS FOR BUILDING PURPOSES

DIVISION OF WOOD TECHNOLOGY, FORESTRY COMMISSION OF NEW SOUTH WALES.

New South Wales possesses a very large number of building timbers some of which are not available in large quantities, although they may be milled and used with very satisfactory results in those districts in which they occur. Occasionally such timbers may find their way on to the Sydney market, and the fact they are not listed herewith, does not in any way indicate that they are necessarily inferior to those which are mentioned.

Under the heading of " Principal Timbers " are listed those woods which are usually readily available on the Sydney market, whilst under the caption " Other Suitable Timbers " are given certain woods which are used locally but which are not always readily obtainable elsewhere. Possible sources of supply of any of the woods listed can be furnished on request.

The common names given are those agreed upon by the Standards Association of Australia and issued as a Draft Australian Standard, and it is urged that these names, preferably accompanied by the botanical names, should be used. It should be realised that the same timber may be known in different districts by entirely dissimilar names, and if there is any confusion with regard to nomenclature, or doubt as to the suitability of a local timber for the required purpose, the Division of Wood Technology should be consulted.

All the woods mentioned are available for inspection at The Technological Museum, Harris Street, Ultimo, whilst descriptions of their properties, and illustrations of many of them, are contained in Baker's " Hardwoods of Australia " or the " Cabinet Timbers of Australia." These publications are available at the Division of Wood Technology or at any public library, or copies can be obtained for 25/– and 10/– from The Technological Museum.

If necessary, further information on the properties and uses of the individual timbers may be obtained on request from the **DIVISION OF WOOD TECHNOLOGY**, Forestry Commission of New South Wales, 96 Harrington Street, Sydney.

SECTION A. FLOOR JOISTS AND BEARERS.

Principal Timbers :

Blackbutt	Eucalyptus pilularis
Tallowwood	,, microcorys
Sydney Blue Gum	,, saligna
Spotted Gum	,, maculata (Sapwood should on no account be permitted).
White Cypress Pine	Callitris glauca

SECTION A. FLOOR JOISTS AND BEARERS—*continued*.

Other Suitable Timbers :

White Stringybark	Eucalyptus eugenioides
Brown Stringybark	,, capitellata
Yellow Stringybark	,, muelleriana
Red Mahogany	,, resinifera
White Mahogany	,, acmenioides
Brush Box	Tristania conferta
Grey Gum	Eucalyptus punctata
	,, propinqua
Forest Red Gum	,, tereticornis
Red Gum	,, rostrata
Alpine Ash	,, delegatensis
	,, gigantea
Mountain Gum	,, dalrympleana
Bangalay	,, botryoides
Woollybutt	,, longifolia
Brown Barrel	,, fastigata
Ironbark	,, paniculata
	,, siderophloia
	,, crebra
Silver-top Ash	,, sieberiana
Obliqua	,, obliqua
Narrow-leaved Messmate	,, phellandra

SECTION B. WALL FRAMING.

(Same as for Section A.)

Care should be taken to select straight grained timber especially in Brush Box (*Tristania conferta*).

SECTION C. ROOF FRAMING.

(Same as for Section A.)

Care should be taken to select straight grained timber especially in Brush Box (*Tristania conferta*).

SECTION D. FLOORING.

Principal Timbers :

Tallowwood	Eucalyptus microcorys
Blackbutt	,, pilularis
Sydney Blue Gum	,, saligna
White Cypress Pine	Callitris glauca

Other Suitable Timbers :

Brush Box	Tristania conferta
Turpentine	Syncarpia laurifolia
Red Mahogany	Eucalytus resinifera
White Mahogany	,, acmenioides
White Stringybark	,, eugenioides
Brown Stringybark	,, capitellata
Yellow Stringybark	,, muelleriana

SECTION D. FLOORING—*continued.*

Spotted Gum	,, maculata (Sapwood on no account should be permitted)
Ironbark	Eucalyptus paniculata
	,, siderophloia
	,, crebra
Grey Gum	,, punctata
	,, propinqua
Forest Red Gum	,, tereticornis
Red Gum	,, rostrata
Alpine Ash	,, delegatensis
	,, gigantea
Mountain Gum	,, dalrympleana
Obliqua	,, obliqua
Narrow-leaved Messmate	,, phellandra
White Ash	,, fraxinoides
Bangalay	,, botryoides
Woollybutt	,, longifolia
Brown Barrel	,, fastigata
Silver-top Ash	,, sieberiana
Hoop Pine	Araucaria cunninghamii
Brush Mahogany (Red Carabeen)	Geissois Benthami
Scented Satinwood (Coachwood)	Ceratopetalum apetalum
Sassafras	Doryphora sassafras
Silver Sycamore	Cryptocarya glaucescens
N.S.W. Walnut	Endiandra virens
Crow's Ash	Flindersia australis

SECTION E. WEATHERBOARDS.

Principal Timbers :

Red Mahogany	Eucalyptus resinifera
Sydney Blue Gum	,, saligna
White Cypress Pine	Callitris glauca
Blackbutt	Eucalyptus pilularis
Tallowwood	,, microcorys

Other Suitable Timbers :

Bangalay	Eucalyptus botryoides
White Mahogany	,, acmenioides
Brown Barrel	,, fastigata
White Stringybark	,, eugenioides
Brown Stringybark	,, capitellata
Yellow Stringybark	,, muelleriana
Alpine Ash	,, delegatensis
	,, gigantea
Mountain Gum	,, dalrympleana
Spotted Gum	,, maculata (Sapwood on no account should be permitted)
Ironbark	Eucalyptus paniculata
	,, siderophloia
	,, crebra

SECTION F. SILLS.

Principal Timbers :	
Tallowwood	Eucalyptus microcorys
Red Mahogany	,, resinifera
Blackbutt	,, pilularis
Other Suitable Timbers :	
Sydney Blue Gum	Eucalyptus saligna
Forest Red Gum	,, tereticornis
Spotted Gum	,, maculata (Sapwood on no account be permitted)
Ironbark	Eucalyptus paniculata
	,, siderophloia
	,, crebra
White Stringybark	,, eugenioides
Brown Stringybark	,, capitellata
Yellow Stringybark	,, muelleriana
Grey Gum	,, punctata
	,, propinqua

SECTION G. LININGS AND CEILINGS.

Principal Timbers :	
Hoop Pine	Araucaria cunninghamii
White Cypress Pine	Callitris glauca
Scented Satinwood (Coachwood)	Ceratopetalum apetalum
Red Mahogany	Eucalyptus resinifera
Blackbutt	,, pilularis
Sydney Blue Gum	,, saligna
Other Suitable Timbers :	
Silver Sycamore	Cryptocarya glaucescens
Sassafras	Doryphora sassafras
White Mahogany	Eucalyptus acmenioides
Silver Ash (Cudgerie)	Flindersia schottiana
Alpine Ash	Eucalyptus delegatensis
	,, gigantea
Mountain Gum	,, dalrympleana
Brush Mahogany (Red Carabeen)	Geissois benthami
Bangalay	Eucalyptus botryoides
Rose Mahogany (Rosewood)	Dysoxylum fraseranum
Rose Maple (Pigeonberry Ash)	Cryptocarya erythroxylon

SECTION H. JOINERY.

Principal Timbers :	
Hoop Pine	Araucaria cunninghamii
Scented Satinwood (Coachwood)	Ceratopetalum apetalum
Alpine Ash	Eucalyptus delegatensis
	,, gigantea
Mountain Gum	,, dalrympleana
Red Cedar	Cedrela toona var. australis

SECTION H. JOINERY—*continued.*

Other Suitable Timbers :

Rose Maple (Pigeonberry Ash)	Cryptocarya erythroxylon
White Ash	Eucalyptus fraxinoides
Silver Ash (Cudgerie)	Flindersia schottiana
White Beech	Gmelina leichhardtii
Rose Mahogany (Rosewood)	Dysoxylum fraseranum
Brush Mahogany (Red Carabeen)	Geissois benthami

SECTION I. PLYWOOD AND VENEERS.

Principal Timbers :

Hoop Pine	Araucaria cunninghamii
Scented Satinwood (Coachwood)	Ceratopetalum apetalum
Silver Ash (Cudgerie)	Flindersia schottiana
Black Bean	Castanospermum australe
Rose Maple (Pigeonberry Ash)	Cryptocarya erythroxylon
Other Suitable Timbers :	
Flooded Gum	Eucalyptus grandis
Alpine Ash	,, delegatensis
	,, gigantea
Rose Mahogany (Rosewood)	Dysoxylum fraseranum
Silver Sycamore	Cryptocarya glaucescens
Sassafras	Doryphora sassafras
N.S.W. Walnut	Endiandra virens
Blush Tulip Oak (Booyong)	Tarrietia actinophylla
Brush Mahogany (Red Carabeen)	Geissois benthami
Bolly Gum	Litsea reticulata
Silver Quandong (Blue Fig)	Elaeocarpus grandis

Some of these timbers are not always readily available ; in addition other woods are often veneered when they show distinctive figure.

BUILDING MATERIALS OF NEW SOUTH WALES

GIVING THE LOCALITY WHERE OBTAINED OR MANUFACTURED.

Extracts from "Prize Essay on Economical Manufacturers" by C. MAYES, C.E., obtained at the Public Libraries, Melbourne, and Sydney.

Asbestos.—This valuable material may now be reckoned in building materials, as it is used largely in the making of walling sheets and slates for roofs. It is stated that a find of asbsetos has been made at Euchareena, between Wellington and Orange. The lode is said to be 70 ft. wide. Large recoveries of asbestos lately found at MacDonald Ranges, Northern Territory, Queensland, 1925.

Basalt or Bluestone and Diorite.—Although not plentiful near Sydney, is generally distributed throughout the eastern half of the colony, and is well adapted for road metal, curbing and channelling, tar, concrete, &c. It will be found at or near the following towns south of Sydney :—**Camden, Campbelltown, Berrima,** Nattai, Robertson, Murrimba, Wollondilly, and **Cookbundoon** Rivers ; Pomeroy near **Goulburn, Crookwell, Boorowa, Gundagai, Coolac** ; near Tumut, **Adelong,** Tumberumba, Yarrangobi, **Kiandra,** Seymour, **Cooma, Cathcart,** and Wyndham, near **Bombala,** near **Bega,** near Moruya, **Jervis Bay, Farnham, Kiama, Jamberoo,** Macquarie Rivulet near **Lake Illawarra, Hornsby** and Pennant Hills, near Sydney. Two of the finest blue metal quarries were opened in the districts of Mittagong and Hornsby.

Kiama.—Large quantities of blue metal are obtained from **Kiama.**

To the west of Sydney, basalt is found near Liverpool and Richmond, at **Emu Plains** near **Penrith,** at Rockley, Rydal, Mount Victoria, near **Bathurst, Blayney, Frederic,** Orange, **the Canoblas, Currajong,** near Parkes, and **Lake Cudgallagong,** on the Lachlan River.

To the far north-west it is found at Hill End and Tamberoora, Hargreaves, Sofala, Newrea, Wellington, Mudgee, Dubbo and Rylstone, also at Crete, Grestore, Muswellbrook, Scone, Murrurundi, Wallabadah, Doughboy Hollow, north-west of Coonabarabran.

To the north it is found near Gloucester, near Stroud, on the Hastings River, near Port Macquarie, West Kempsey, Nundle, Tamworth near Walcha, near Armidale, Uralla, Falconer, Glen Innes, near Newtown, Boyd, near Gordon and Tabulam on the Clarence River, Lismore, &c., on the Richmond River, the Tweed River, also at Deepwater on the Severn Rivers, Wellingrove, Byron, Inverell, &c.

BRICKS.

Fire Clay and superior bricks are made at Enfield, St. Peters, Liverpool, Lithgow Valley, Brisbane Water, Wollongong, Mudgee, Wallerawang, Bulli, Granville, Yass, Bathurst, Dapto, Tamworth, Armidale, Broken Hill, Albury, Vegetable Creek, &c., and may be looked for generally on the coal measures and the country between Berrima and the Hawkesbury River.

GRANITE.

Granite is found at Tamworth, Trial Bay, Gabo Island, Moruya, &c. The polished granite columns of the Post-office at Sydney are Moruya granite. Slabs for facing concrete structures in Sydney, North Shore Bridge, facing stones for piers and approaches, 1925.

A **finer grained granite** has also been procured from Montague Island, about 20 miles south of Moruya. Blocks of granite, weighing 16 tons, were brought from the above localities and used in the General Post Office, Sydney.

A **light red granite** is found at Trial Bay, and used there in the erection of a lighthouse, &c.

GYPSUM.

Gypsum (*sulphate of lime*) crystallised and amorphous or lumpy, is found in large quantities near Mount Browne goldfields, Balranald.

It is easily burnt into Plaster of Paris, as limestone is burnt into lime.

Limestone, dense blue, from Port Stephens ; cream colour, with brown veins, from Mudgee.

From the Mineral Statistics of New South Wales, I find that a grey crystalline limestone is found near Wollongong, containing :— Carbonate of lime, 74.3 ; carbonate of magnesia, 0.8 ; alumina, 7.3 ; oxide of iron, 3.1 ; phosphoric oxide, 0.4 ; silica, 10.7 ; organic matter and water, 3.4. This limestone when burnt gives a brownish hydraulic lime.

Mountain Limestone.—The Fish River, Jenolan Caves, Yarrangobilly Caves, Wellington Caves, and Cavan Caves, near Yass, are in this formation.

Limestone is also found at Kempsey, Nundle, Murrurundi, Scone, Copeland, Dubbo, Wyndeyer, Ironbarks, Parkes, Forbes, Orange, Cow Flat, Caloola, Tuena near Junee, Jugiong, Yass, Goulburn, Gundagai, Adelong, Kiandra, Braidwood, Wingham, Gloucester, Stroud, Ophir, Wallerawang, Rockley, Bookham, Queanbeyan, Bombala, &c., being most prevalent in the silurian or goldfields formation, and extensive lime kilns have been erected at Marulan, Bowning, near Yass, and Piper's Flat.

MARBLE.

Some of the **finest** and **soundest** marbles in the world are found in New South Wales, coming from the districts of Orange and Bathurst. The quarries at Caloola Creek, near New bridge, **Borenore,** and **Fernbrook,** produce coloured marble of great beauty, and white marble of great purity. The base of Queen Victoria's Memorial statue in Melbourne is of this Caloola marble. Her Majesty's Theatre, Sydney, staircase, Stanway house, Prince Edward Theatre, &c., and many other offices and banks, are from **Borenore,** and in colour are Rouge, Breccii, and St. Annes.

Queen Alexandra Rouge and variegated, and marbles most brilliant in tones, are found there.

There is also good red and **white** marble at Tamworth, and **black marble** at Bibbenluke.

Marulan Marble.—White, grey, reddish purple, and black.

Cow Flat marble is white, and was used with the black marble from Marulan in flooring the great hall of the Sydney University and Public Library stair-landings.

Wallerawang Marble (white, cream and dove colour), can be obtained of any size. The quarries are seven miles from Wallerawang railway station. The Kandos Portland cement works are in that district.

FREESTONE.

Sandstone (free), suitable for building and grindstones, is quarried in Sydney and suburbs, Manly, Brisbane Water, Lithgow Valley. These latter are from the same geological formation as the coal measures. and therefore similar to the Sydney (free) sandstone so largely used in the best buildings of Sydney, &c.

Sandstone, varying greatly in hardness and cost of dressing, is obtained even from Pyrmont, Sydney. Ordinary free sandstones are also quarried at Randwick, Mosman's Bay, North Shore, Hunter's Hill, Parramatta, Waverley, and along the Illawarra line.

Pyrmont sandstone, from the **lower** beds, of yellow colour, fine grained, withstood a pressure by Professor Warren when applied to 3 inch cubes of 39,000 lbs., and to 4 inch cubes of 100,000 lbs. An equal sided cube foot sustained a pressure for 20 minutes of 200 tons when tested.

Good Sandstone, suitable for building, is also found at Maroubra State Quarries, Hawkesbury sandstone, now used for light grey **facings** to concrete buildings, East Maitland, Morpeth, Clarence Town, Muswellbrook, Rutherford, and Ravensfield. All these are similar to the Sydney sandstone, and generally of a creamy or sienna colour. At Paterson, on the Hunter River, it is of a greenish tinge, and at Wollombi of a pink and light brown tint.

Sandstone (*Silurian*), from Albury and Mudgee, Goulburn, Bukingbong, and Narrandera. These sandstones are harder and in smaller beds than those from the coal measures. and may be looked for on all the goldfields. They are not so good for building blocks, being strongly laminated.

Grey Stone is found at Molong and Orange, in level beds, and is good for flagging, steps and sills having been used in Government buildings there.

The **price** for **clean chiselling,** this stone, or viz., sawn by machinery, is 2/6 per super foot.

SLATE.

Silurian or goldfields formation.—A third class slate, from Kerraway, near Goulburn, also at Cookbundoon.

South Gundagai Slate.—A superior kind of slate is found here.

At Millamurrah, near Bathurst, roof slates were taken out.

TERRA COTTA.

Terra Cotta of a superior class is made at the Sydney potteries, Enfield, Camperdown, Granville, Liverpool, St. Peters ; also at Lithgow Valley and Albury, &c.

TRACHYTE.

Is found at Mittagong and Bowral, and is used in the railway bridge over the Hawkesbury River, to resist decay from sea water.

Trachyte, light blue, from Bowral, Mittagong and Clarence Town. It has been used in Government and many other buildings in Sydney, and where strength, density is required, takes a high lasting polish.

The **cost of working** is between bluestone and Adelaide marble or Moruya granite. (See stonecutting).

BUILDING MATERIALS OF VICTORIA

GIVING THE LOCALITY WHERE OBTAINED OR MANUFACTURED.

Basalt or Bluestone, of volcanic or igneous origin, and forms some of the largest plains of Australia, is found near Melbourne, although very durable, it is not used where a light appearance or architectural effect is required. It is well adapted for foundations, basements, &c.

Bricks, etc.—In consequence of the absence of good freestone in Melbourne, the manufacture of ornamental bricks is a fine art, and good brick architecture has resulted.

Tiles, are made by the Australian Tesselate Tile Co. of Melbourne, and T.C. Faience Tiles by Wunderlich & Co.

GRANITES.

A first-class **Grey and Cream colour** Granite is found at Beech worth.

Grey granite is found at **Sandhurst, Mount Alexander, Harcourt.** The latter is the finest and best. It is made into columns, polished, and exported.

Granite is also obtained from Mount Eliza, Mount Martha, Plenty Ranges, Mount Backwood, Refuge Cove, Gabo Island, &c. The latter granite is probably the hardest and most durable.

SANDSTONE.

Sandstone, suitable for building, is obtained from the various goldfields, but it is generally very hard, laminated, and often micaceous, and is therefore better adapted for flagging or flat-bedded rubble. A soft sandstone was obtained at Bacchus Marsh and Darley. Both these free sandstones are too soft and friable for permanent buildings.

Stawell Free Sandstone is obtained from the Grampian Hills, about eighteen miles from Stawell. It is a fine close-grained heavy sandstone, and apparently of a durable quality ; but its appearance in the above building is greatly marred by particles of ironstone thinly interspersed, which, when exposed to the weather, disintegrate or waste away, running down the face of the stone and staining it. This stone is used for third storey to the General Post Office, Melbourne.

The **cost of working** the Stawell sandstone is about 50 per cent. more than the Tasmanian freestone.

Barrabool Hill Free Sandstone is found near Geelong, and has been largely used there, and in building St. Paul's Cathedral, Melbourne.

SLATE.

Slate is found in many parts of Victoria.

Castlemaine Slate is equal, on the whole, to the Welsh slate. It is said to be much stronger than sawn bluestones.

LIMESTONES.

Limestones suitable for building are found at Waurn Ponds near Geelong; it is much cheaper than the Oamaru free limestone.

Portland, Warrnambool and Malmsbury Limestones are granulated and porous; they are used for building-stone or burnt into lime.

Recent or Tertiary Limestone is found throughout the north-western portions of the colony, between the settled districts and the Murray River on the north, extending into South Australia on the west. It is also found at Benalla and the Delegate River or near the coast limestone is found at Belfast, Cape Otway, Western Port, Cape Patterson, Cape Liptrap, Lake Victoria, and Ninety-mile Beach.

Hydraulic Lime is made at Limestone Creek, near Guildford, and Bacchus Marsh. The Collingwood or Fitzroy limestone contains 52 per cent. carb. of lime; 18 per cent. carb. of magnesia; 12 per cent. alumina; and 18 per cent. hydraulic silica.

The lime is said to be similar in appearance and properties to the noted Blue Lias lime.

Septaria, in the form of white and grey cement stones, are obtained at Spring Creek, 15 miles from Geelong.

QUEENSLAND BUILDING MATERIALS

GIVING THE LOCALITY WHERE OBTAINED OR MANUFACTURED.

Freestone.—*Sandstone and Fire-clay* will be found in all the Coal fields of Queensland, the dip is flat and never exceeds 30 degrees.

Breakfast Creek quarry, about 3½ miles from Brisbane, has supplied most of the stone used in Brisbane, and is the stone quoted in my price list. It is durable, fine grained, and of a suitable colour.

The sandstone found near Brisbane and in the southern districts of Queensland belongs to the coal measures, and has its prototype in Sydney and suburbs. The **cost of working** is also the **same.**

Goodna, on the Brisbane River, abounds in good sandstone quarries from which the sandstone for the Parliament House, Government House and Town Hall were obtained.

Grantham.—First-class sandstone is found varying in colour from white to brown. It was used in the Government Printing Office, Brisbane, and is also used for grindstones.

Helidon.—A good, hard and durable sandstone which varies much in colour (white, brown and liver), the liver and brown coloured stone being very durable. The Custom House and National Bank, Brisbane, are built of this stone.

Highfield quarries, the stone was used in Treasury Buildings.

Ipswich Coal Measures.—The coal measures also produce fine brick earth or shales from which the best bricks, tiles and terra cotta are made. The coal measures are also found at Maryborough, Rockhampton, Warwick, West Moreton, and Brisbane.

Murphy's Creek quarries yield good stone, similar to that found near Goodna.

Mogul, 4 miles from Goona, good sandstone, with very fine black specks, of no detriment to its appearance or durability. It can be obtained of any size up to 50 tons.

Warwick Railway Station and Town Hall are built with sandstone from Mount Storat quarry. Hospital is built of that stone.

Granite.—At Gilbert goldfields **red granite** is found.

Ravenswood, green granite and **Statuary marble.**

Broken River.—Tropical Queensland. Black fossil marble, also **basalt** or **bluestone.**

Gladstone variegated marble (marble front).

Calliope River.—Rose, Black, white, yellow, and other marbles.

Rockhampton.—Variegated marbles from quarry, Northumberland Group ; also from Percy and other islands on the Queensland coast.

Warwick.—Black and **white statuary** marbles.

Porphyry.—This is a curious conglomerate of primitive rocks of all tints, pink predominating. It is used in Brisbane for the bases of buildings, kerbing, channelling, and metalling the streets, &c. The R.C. Church is wholly built of it ; the Normal School also, with sandstone dressings to openings. It is much harder than the freestone, but not so hard or costly to work as the Melbourne bluestone.

TIMBER TREES OF QUEENSLAND.

The Queensland Maple, also called silkwood or red beech, is a light coloured timber ; grows principally north of Townsville, 50 or 60 miles inland along the coast line, and is a very sound wood, available in large sizes. The tree grows up to 20 feet girth. It is the fancy wood of Queensland (1914), and is suitable for furniture, shop and office fittings, and is now extensively used in superior work, taking the place of cedar in joinery in all the Australian States.

The Government are using it for railway and tram car interior and construction.

Moreton Bay Ash (*Euc. tesselaris*).—Diam., 14 to 25 inches ; height, 30 to 60 feet. Timber of a brownish colour, not hard, but tough ; it is found north and south in the colony.

Moreton Bay Pine (*Araucaria*).—Diam., 30 to 60 inch ; height, 150 to 200 feet. The timber is used extensively in this colony. The wood is strong and durable when kept dry, but soon decays when alternately damp and dry. When procured from the mountains of the interior it is fine-grained, and is susceptible to a high polish.

Peppermint or Turpentine Tree (*Euc. microcorys*).—Diam., 18 to 36 inches ; height, 60 to 80 feet. Timber strong and durable.

Red Gum (*Euc. territicornis*).—Diam., 18 to 36 inches ; height, 60 to 90 feet. Used in fencing, building, plough-beams, poles, and shafts of drays, and also in ship-building.

She Oak (River) (*Cas. glauca*).—Diam., 24 to 36 inches ; heigh, 70 to 90 feet. A robust tree, and grows on the borders of rivers and creeks. The timber is strong and tough, used for staves, shingles, &c.

Spotted Gum (*Euc. maculata*).—Diam., 20 to 36 inches ; height, 60 to 80 feet. It is a very valuable timber, on account of its strength and elasticity ; used for buggy shafts, cogs of wheels, &c. In bridge-building it is used for tie-beams, &c., and is found to have the highest constant strength of any of the Queensland timbers.

WHARF-PILE TIMBERS.

Queensland abounds in valuable timbers of over forty different varieties. Cypress Pine, She-ash, Swamp Mahogany, Turpentine, and Ironbark are the most suitable for piles for wharfs and tidal river bridges. Experiments conducted with Moreton Bay Pine, Blue Gum, Spotted Gum, Swamp Mahogany, and She-ash showed that only two of the above resisted the ravages of cobra also Swamp Mahogany and She-ash. The other woods succumbed to the destructive worm.

SOUTH AUSTRALIAN BUILDING MATERIALS

See Other Building Materials, pages 35, 293.

DOLOMITE.

Dolomite, or Magnesian Limestone, is a first-class building stone, but the great cost of working it with edged tools will prevent its being used except as rubble. If dolomite contains over 5 per cent. of alumina, it makes an excellent hydraulic lime.

GYPSUM.

In nodules and crystals, is found in Yorketown and burnt into Plaster of Paris.

LIMESTONE.

Tertiary is largely distributed over the State in the form of soft freestone, very much like the Oamaru freestone of New Zealand. The yellow limestone from Murray bridge contains minute small shells ; is used in public buildings of Adelaide, and looks like Sydney freestone, 13 c. ft. per ton.

Parrawilla Limestone is extensively found in the southern sea coast ; of a salmon tint, it is soft, and easily cut with a knife.

Manoora, Teatree Gully, etc.—Yield abundance of freestone. Excellent blocks of even quality can be procured up to ten tons weight. This stone has been used for the University in many colours, white and buff. Weight about 138lbs. per cubic foot, or 16¼ feet per ton.

Freestone.—This is another name given to those soft portions of the above limestones that are suitable for building. Quarries south-east of the colony, are at the Hanging Rocks, Mount Gambier district, &c. Like Oamaru stone, it extends from the Gawler Plains to Mount Gambier.

Marble.—From Rapid Bay, first-class.

Kapunda Marble was used for facing the new Parliament Houses at Adelaide.

White Marble, from Macclesfield, Angaston, &c. The great cost of working this and other marbles would preclude them coming into

general use, except for ashlaring cemeteries, monuments, mantels slabs, &c.

Slate.—Good roofing slates are obtained at the Willunga quarries, and **Slate Slabs** at Mintaro.

TASMANIAN BUILDING MATERIALS

CEMENT.

Maria Island Cement.—The **natural cement stone** forming the cliffs, 200 to 1500 feet high make excellent cement.

Bricks.—Fire-clay, Pottery-clay, Fire-bricks, Paving Tiles, and Terra Cotta, etc., can be obtained from Seymour, &c.

Freestone (Sandstone).—Good building, from Teatree, 21 miles from Hobart ; also from Lindisfern and Mona Vale ; all being similar to the Point Bentenet and Spring Bay sandstone. Freestone from Knocklofty is of a brown tinge.

Granite is found on the north-east coast of Tasmania.

Limestone and **Marble** is found near Beaconsfield, the River Tamar, and near New Norfolk.

A large portion of the lime made near Hobart and the Don River is more or less **hydraulic,** and well adapted for concrete. As it is liable to fire when slacking, it cannot be exported as quick or fresh lime.

Blackwood, one of the finest cabinet-woods in Tasmania ; also used for wheels, casks, carriages, and railway trucks ; colour of a light walnut ; maximum height, 130 feet, and diam. 4 to 6 feet.

Blue Gum (*Eucalyptus globulus*), so called by Labillardiere, who discovered it in Tasmania, in 1792. The leaves when young are of a bluish green and nearly round ; they afterwards become long and narrow, of a sea-green colour, and very fragrant, producing small white fragrant flowers. The wood when mature is hard, dense, and durable.

Eucalyptus piperita is another description of blue gum largely used for ship-building.

Celery Top Pine grows as large as the Myrtle. It is straight-grained, and makes good flooring boards, as it does not shrink much.

He Oak, or Swamp Oak.—Coarse-grained, light, and tough, and beautifully marked for furniture making.

Huon Pine, like bird's-eye maple, used for panels of doors, &c., and for cabinet work. It is found at Port Macquarie, Port Davy, Pieman River, and on the western coast generally.

King William, or Forth Pine, up to 12ft. girth, is found at the head of the Forth River.

Myrtle, or Tasmanian Beech.—Colour, yellowish pink, highly ornamental cabinet wood ; maximum height, 200 feet, and diam., 12 feet. It is used for flooring boards, carpentry, and is said to resist the cobra.

Peppermint (*Eucalyptus amygdalina*).—This is a superior wood for piles, and is said to resist the attacks of the cobra.

Red or Pencil Pine, from near the source of the River Forth.

NEW ZEALAND BUILDING MATERIALS

Oamaru Free Limestone.—Is a white granular limestone. Uniform of colour and texture, and can be obtained in large blocks. It is quite soft when quarried, but hardens rapidly on exposure to a dry atmosphere. This enables it to be worked into most elaborate ornamentation at little cost.

The durability of the Oamaru stone in its resistance to the disintegrating action of sulphate of soda is comparatively feeble.

The Bank of Australasia and Imperial Insurance Offices, in Melbourne, are built with this stone: also ornamented stone steeple and church, Bondi, Sydney, 1880 to 1927.

Trachyte is a fine grey stone, found at Port Chalmers, and used in the construction of the Graving Dock there. It is said not to cost so much as Bluestone to work. It resists the action of fire, and is used for building lime-kilns in Otago.

Kauri (*Dammara Australis*) (Lambert).—The Kauri is the finest forest tree in New Zealand, and attains a height of 120 to 160 feet. The trunk is sometimes 80 to 100 feet high before branching, and attains a diameter at the base of 10 to 20 feet, but is now getting scarce.

It occurs only in the North Island, and north of Mercury Bay, and grows best near the sea, on wet clay land.

The turpentine of this tree forms the celebrated Kauri Gum, which is extensively excavated from the sides of old forests as far south as Taranaki. Kauri was used in the construction of the Queen's Wharf, Auckland, and after 23 years, the sea-worms had eaten only the sap-wood of the young timber.

Kauri pine has been proved one of the best soft wood timbers of the world, being harder than Baltic deal, and entirely free from knots.

MEASUREMENTS AND WEIGHTS OF COINS.

A bronze halfpenny measures exactly 1 inch in diameter—5 equal 1 oz.
A bronze penny measures exactly 1.2 inch in diameter 3 ,, ,,
A florin and a sixpence weigh $\frac{1}{2}$ an ounce.

Term penny as applied to nails—

Three penny means 3 pounds to 1000 nails.
Eight penny means 8 pounds to 1000 nails.

The diameter of a circle multiplied by .8862 equals side of equal square in area.

The diameter of a circle multiplied by .7071 equals diameter inscribed square in circle.

The side of a square multiplied by 3.545 equals circumference of a circle of equal area.

The circumference of a circle multiplied by .2821 equals side of a square of equal area.

The diameter of a circle multiplied by 3.1416 equals circumference.

HINTS ON RECKONING.

Given the price per ton to find value of more or less weight.

Reckon the tons as pounds, cwts., as shillings, each quarter as 3d., and for every 9lbs. as 1d.

USEFUL TABLES AND MEMORANDA.

LIFTING A STONE BUILDING.

As an example of what can be done in the direction of **underpinning**, the alteration recently made to a two-storey **masonry structure** in Illinois (says the London *Builder*) is decidedly worthy of attention.

The building, used as a county courthouse, covers an area of nearly 10,000 square feet, the walls are about 60ft. high, and the roof is surmounted by a heavy dome. For the purpose of forming a new lower storey, the entire structure was raised bodily by more than 12ft.

The mode of operation seems to have been particularly simple, and was as follows :—

Rectangular holes at short intervals were cut through all the outer and two cross walls, about 3ft. above the ground level.

Two or three 15in. steel I-beams were then inserted in each hole, the ends being supported on 12in. square timbers parallel with the walls.

The timbers in turn were set on 10-ton screw-jacks resting upon two 12in. square sills.

By the aid of a large gang of men the jacks were screwed up gradually until the whole building had been lifted 6in., when the load was transferred to timber beams placed on each side of the walls, these beams being shored up whilst cribwork was built beneath the jacks so that the next lift might be made.

When the structure had been raised 2ft. the old foundations were taken away, and a third crib was added and continuously built up as the work progressed.

Finally the centre crib was removed, and in its place new foundations were formed, and new walls were carried up to the old work.

Each front of the building includes a massive portico, having four stone columns, each weighing about 50 tons. These porticos were raised together with the main walls by using longer steel beams at the necessary points. It is said that the work was successfully accomplished without cracking the masonry or causing any other structural injury.

REMOVING RUST FROM IRON.

May easily be effected by immersing the article in a nearly saturated solution of chloride of tin, even if much eaten into. The duration of the immersion will depend upon the thicker or thinner film of rust ; in most cases, however, 12 to 24 hours will suffice. The solution of chloride of tin must not contain too great an excess of acid, otherwise it will attack the iron itself. After the articles have been removed from the bath, they should first be washed in water, and then with ammonia, and be dried as quickly as possible. Articles treated in this manner assume the appearance of dead silver.

Prevent Lead from spluttering in leading iron pallisading into stone.—Drop oil into hole or mould.

To test Iron or Steel.—A drop of nitric acid turns iron white and steel black

Flux for Soldering Zinc.—Dissolve small pieces of zinc in muriatic acid, with water, double quantity.

To toughen Plaster Casts and prevent cracking, saturate them in hot glue and water—1 to 5.

Never use Tarred Paper under a tin roof. The acid in the tar destroys the metal.

Place thick paper under tin to prevent damage when laid on concrete.

To hang a door that will rise as it opens and also shut itself unaided, use a wider butt hing eat bottom than top of door.

To **Underpin Super-structure of Building** for Insertion of Rolled Steel Joists or Girders.—Above the proposed girder position make holes through wall at most solid portions, such as between windows or openings above, sufficient only to insert cross girders, of steel preferred. Support these each on timber or steel uprights, leaving sufficient room for insertion and working of proposed girders between the rows of uprights. Raise uprights to required height by "fox-tail" wedges inserted at bottom, and staying uprights if necessary. When the weight is taken, carefully remove the building material, of stone or brick.

Place your bearer in position with ends secured, then, build in with cement and iron wedges driven above girder till the whole length is solidly resting on girder, and properly set and dry; then remove under-pinning timbers and cross girders, the holes being built up solid.

Simple method of framing for concrete **kerbs and gutters** is with 9in. x 3in. Oregon on each side of kerbs, the gutters being made after the 9in. x 3in. being placed on its flat for boundary and levels.

Concrete bressemers over openings are made by upright supports, one each side of wall, with cross-pieces nailed underneath, allowing for thickness of planking, at sides and bed. The planks are easily released when concrete is dry by simply knocking loose the cross-pieces.

MENSURATION OF SURFACES AND VOLUMES.

Area of rectangle = length x breadth.

Area of triangle = base x half perpendicular height.

Diameter of circle = radius x 2 = circumference x 0.31831.

Circumference of circle = diameter x 3.1416

Area of circle = square of diamater x 7854

Area of surface of cylinder = circumference x length plus area of two ends.

To find diameter of circle having given area: Divide the area by 7854 and extract the square root.

To find the volume of a cylinder: Multiply the area of the section in square inches by the length in inches = the volume in cubic inches. Cubic inches divided by 1728 = volume in cubic feet.

Surface of a sphere = square of diameter x 3.1416

Volume of a sphere = cube of diameter x .5236.

Side of an inscribed cube = radius of a sphere x 1.1547.

Area of the base of a pyramid or cone, whether round, square, or triangular, multiplied by one-third of its height = the volume.

To find area of a circle multiply square of diameter by .7854.

To find diameter of a circle multiply circumference by .31831.

To find circumference of a circle multiply diameter by 3.1416.

BRITISH WEIGHTS AND MEASURES

Lineal measure.

7.92	inches	=	1 link.			
12	inches	=	1 foot.			
3	feet	=	1 yard.			
6	feet	=	1 fathom.			
5½	yards	=	1 rod, pole, or perch.			
100	links	=	66 feet	=	1 chain.	
220	yards	=	40 poles	=	10 chains	= 1 furlong.
8	furlongs	=	80 chains	=	1,760 yards	= 5,280 feet = 1 mile
6,080	feet	=	1 Admiralty knot.			

Square Measure.

144	square inches... ...	=	1 square foot.
9	square feet	=	1 square yard.
30¼	square yards	=	1 square pole, rod, or perch.
40	square poles	=	1 rood.
4	roods	=	4,840 square yards = 1 acre
640	acres	=	1 square mile.

Liquid Measure.

8.665	cubid inches ...	=	1 gill.
4	gills	=	1 pint.
2	pints	=	1 quart.
4	quarts	=	1 gallon.
1	gallon	=	277¼ cubic inches or 0.16 cubic foot
1	,, ...	=	10lbs. of distilled water.
1	cubic foot ...	=	6.232 gallons.
1	cwt. water ...	=	1.8 cubic foot.
1	bushel	=	1.28 ,,

Avoirdupois Weight.

27.344	grains	=	1 drachm.
16	drachms	=	437½ grains = 1 ounce.
16	ounces	=	7,000 grains = 1 pound.
14	pounds	=	1 stone.
28	pounds	=	1 quarter.
4	quarters	=	112 pounds = 1 hundredweight.
20	hundredweight ...	=	2,240 pounds = 1 ton.

Troy Weight.

24	grains	=	1 pennywieght.
20	pennyweights ...	=	480 grains = 1 troy ounce.
12	troy ounces	=	5,760 grains = 1 troy pound.

Measures and their Square Dimensions.

		in.	in.	in.		in.	in.	in.
1 pint	=	4	x 4	x 2-1/10	31½ gals.—1 barrel			
1 quart	=	4	x 4	x 3-9/16		24	x 24	x 14.7
1 gallon	=	7	x 4	x 8½	½-bushel	12	x 11.2	x 8
10 gals.	=	14	x 15	x 11	1 bushel	12	x 11.2	x 16
5 bushels	=	24	x 28	x 16				

Metres and Feet.

1 metre	= 3ft 3.3704in.	1 foot	= .304 metres

THE HANDY READY RECKONER.

No.	1¼d.	1½d.	1¾d.	2d.	2¼d.	2½d.	2¾d.	3d.	3¼d.	3½d.	3¾d.	4d.	4¼d.	4½d.	4¾d.	5d.	5¼d.	5½d.	5¾d.
Art.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1	0 1¼	0 1½	0 1¾	0 2	0 2¼	0 2½	0 2¾	0 3	0 3¼	0 3½	0 3¾	0 4	0 4¼	0 4½	0 4¾	0 5	0 5¼	0 5½	0 5¾
2	0 2½	0 3	0 3½	0 4	0 4½	0 5	0 5½	0 6	0 6½	0 7	0 7½	0 8	0 8½	0 9	0 9½	0 10	0 10½	0 11	0 11½
3	0 3¾	0 4½	0 5¼	0 6	0 6¾	0 7½	0 8¼	0 9	0 9¾	0 10½	0 11¼	1 0	1 0¾	1 1½	1 2¼	1 3	1 3¾	1 4½	1 5¼
4	0 5	0 6	0 7	0 8	0 9	0 10	0 11	1 0	1 1	1 2	1 3	1 4	1 5	1 6	1 7	1 8	1 9	1 10	1 11
5	0 6¼	0 7½	0 8¾	0 10	0 11¼	1 0½	1 1¾	1 3	1 4¼	1 5½	1 6¾	1 8	1 9¼	1 10½	1 11¾	2 1	2 2¼	2 3½	2 4¾
6	0 7½	0 9	0 10½	1 0	1 1½	1 3	1 4½	1 6	1 7½	1 9	1 10½	2 0	2 1½	2 3	2 4½	2 6	2 7½	2 9	2 10½
7	0 8¾	0 10½	1 0¼	1 2	1 3¾	1 5½	1 7½	1 9	1 10¾	2 0½	2 2¼	2 4	2 5¾	2 7½	2 9¼	2 11	3 0¾	3 2½	3 4¼
8	0 10	1 1	1 2	1 4	1 6	1 8	1 10	2 0	2 2	2 4	2 6	2 8	2 10	3 0	3 2	3 4	3 6	3 8	3 10
9	0 11¼	1 1½	1 3¼	1 6	1 8¼	1 10½	2 0¾	2 3	2 5¼	2 7½	2 9¾	3 0	3 2¼	3 4½	3 6¾	3 9	3 11¼	4 1½	4 3¾
10	1 0½	1 3	1 5½	1 8	1 10½	2 1	2 3½	2 6	2 8½	2 11	3 1½	3 4	3 6½	3 9	3 11½	4 2	4 4½	4 7	4 9½
11	1 1¾	1 4½	1 7¼	1 10	2 0¾	2 3½	2 6¼	2 9	2 11¾	3 2½	3 5¼	3 8	3 10¾	4 1½	4 4¼	4 7	4 9¾	5 0½	5 3¼
12	1 3	1 6	1 9	2 0	2 3	2 6	2 9	3 0	3 3	3 6	3 9	4 0	4 3	4 6	4 9	5 0	5 3	5 6	5 9
13	1 4¼	1 7½	1 10¾	2 2	2 5¼	2 8½	2 11¾	3 3	3 6¼	3 9½	4 0¾	4 4	4 7¼	4 10½	5 1¾	5 5	5 8¼	5 11½	6 2¾
14	1 5½	1 9	2 0½	2 4	2 7½	2 11	3 2½	3 6	3 9½	4 1	4 4½	4 8	4 11½	5 3	5 6½	5 10	6 1¾	6 5	6 8½
15	1 6¾	1 10½	2 2¼	2 6	2 9¾	3 1½	3 5¼	3 9	4 0¾	4 4½	4 8¼	5 0	5 3¾	5 7½	5 11¼	6 3	6 6¾	6 10½	7 2¼
16	1 8	2 0	2 4	2 8	3 0	3 4	3 8	4 0	4 4	4 8	5 0	5 4	5 8	6 0	6 4	6 8	7 0	7 4	7 8
17	1 9½	2 1½	2 5¾	2 10	3 2¼	3 6½	3 10¾	4 3	4 7¼	4 11½	5 3¾	5 8	6 0¼	6 4½	6 8¾	7 1	7 5¼	7 9½	8 1¾
18	1 10½	2 3	2 7½	3 0	3 4½	3 9	4 1¼	4 6	4 10½	5 3	5 7½	6 0	6 4½	6 9	7 1½	7 6	7 10½	8 3	8 7½
19	1 11¾	2 4½	2 9¼	3 2	3 6¾	3 11½	4 4¼	4 9	5 1¾	5 6½	5 11¼	6 4	6 8¾	7 1½	7 6¼	7 11	8 3¾	8 8½	9 1¼
20	2 1	2 6	2 11	3 4	3 9	4 2	4 7	5 0	5 5	5 10	6 3	6 8	7 1	7 6	7 11	8 4	8 9	9 2	9 7
21	2 2¼	2 7½	3 0¾	3 6	3 11¼	4 4½	4 9¾	5 3	5 8¼	6 1½	6 6¾	7 0	7 5¼	7 10½	8 3¾	8 9	9 2¼	9 7½	10 0¾
22	2 3½	2 9	3 2¼	3 8	4 1¾	4 7	5 0½	5 6	5 11½	6 5	6 10½	7 4	7 9½	8 3	8 8½	9 2	9 7¾	10 1	10 6½
23	2 4¾	2 10½	3 4¼	3 10	4 3¾	4 9½	5 3½	5 9	6 2¾	6 8½	7 2¼	7 8	8 1¾	8 7½	9 1¼	9 7	10 0¾	10 6½	11 0
24	2 6	3 0	3 6	4 0	4 6	5 0	5 6	6 0	6 6	7 0	7 6	8 0	8 6	9 0	9 6	10 0	10 6	11 0	11 5¾
25	2 7¼	3 1½	3 7¾	4 2	4 8¼	5 2½	5 8¾	6 3	6 9¼	7 3½	7 9¾	8 4	8 10¼	9 4½	9 10¾	10 5	0 11¼	11 5½	11 11½

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For further information refer to pages 121 *and* 298 *and see advt. on next page.*

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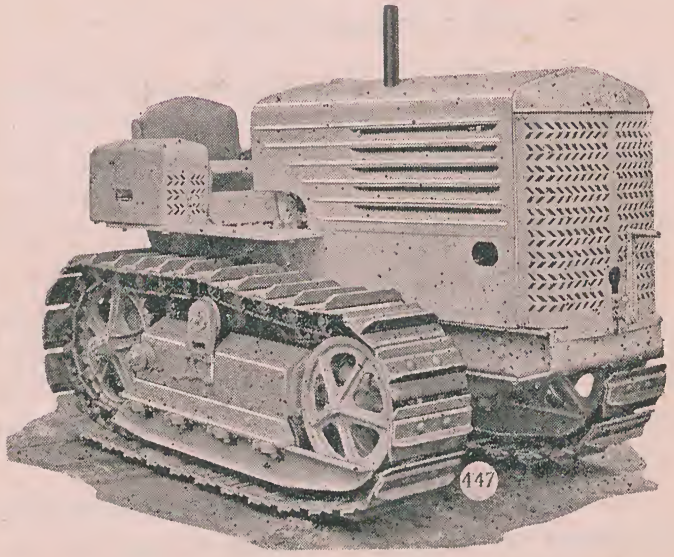

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